Electric Generation and Distribution in Canada

Leo G. Denis

Commission of Conservation
Canada

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Commission of Conservation
Canada

ELECTRIC GENERATION AND DISTRIBUTION IN CANADA

BY

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OTTAWA, 1918

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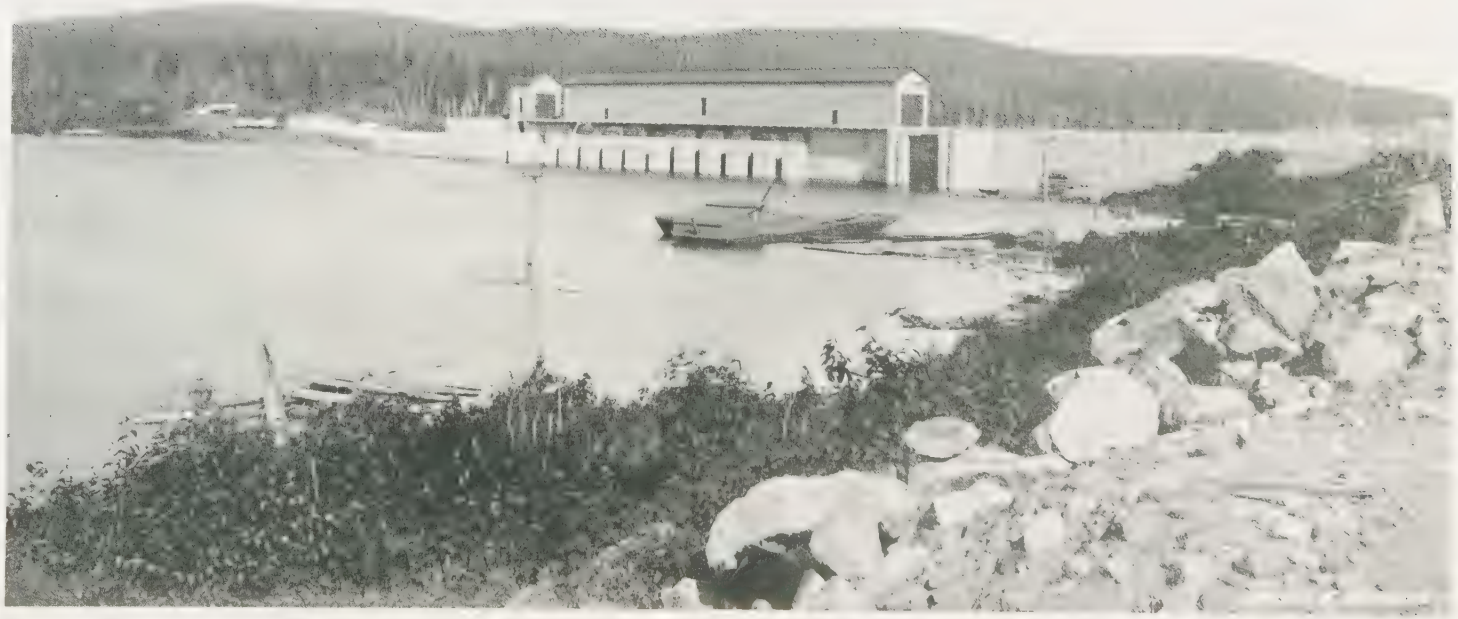

LA LOUTRE DAM, UPPER WATERS OF RIVER ST. MAURICE, CHAMPLAIN CO., QUE. JULY, 1918. UPSTREAM SIDE. WATER LEVEL, 1,310 FEET

La Loutre Reservoir, capacity 160,000 million cubic feet, is the second largest artificial reservoir in the world, being exceeded only by Gatun Lake, Panama Canal, which has a capacity of 183,000 million cubic feet.

INTRODUCTION

IT is sometimes stated that the degree of progress and civilization of a country may be gauged by its electric development; in this respect, and with due regard to population, the results of the investigation shown in this report demonstrate quite clearly that Canada stands in the front rank. The extensive developments which have marked the industrial and domestic use of electric energy in Canada are noteworthy.

The importance of obtaining reliable and comprehensive information on this subject needs no demonstration. It is self-evident, and the Commission of Conservation recognized its desirability six years ago. In 1912, the writer pointed out the need of a power survey;* this was undertaken by the Mining Engineer of the Commission, and much valuable data were collected. It was found, however, that the immense field covered by the investigation, combined with the Commission's limited financial resources, rendered it necessary to confine the enquiry to one branch at a time. Attention was, therefore, first directed to electric power plants, the information relating to such being usually available in greater detail and being more reliable. The object of the present report is to show the important place electric energy occupies in Canada and, at the same time, provide the various companies and individuals concerned therewith with information regarding the operation and general conditions obtaining in other places. One of the greatest incentives to progress is the dissemination of knowledge of what is being done outside one's own immediate sphere. The report also will serve, in large part, as a general power survey, as, in most cases, the kind of power used to operate an electric plant in a certain district will be found the most advantageous.

In a recent paper, Mr. Julian C. Smith, of the Shawinigan Water and Power Co., stated that:†

"We may, some day, see the time when practically everyone will obtain electric power as readily as they now obtain telephone service or the service of good roads, but these problems cannot be solved without due regard to the factors involved, and the sooner everyone realizes that such factors do exist, the closer we may arrive at a solution of one of the most difficult problems which now exist in the sale of electric power in small units. . . . We are in the midst of an enormous extension in electric power systems, and we may look forward to doubling the sale of electric energy in the next ten years.

The greater portion of the information for the report was obtained by correspondence directly with the principals of the organizations involved. When necessary, however, the data were supplemented by personal visits. In draughting the questionnaire containing the information desired, only items which it was thought might be obtained from, at least, a great majority of the plants, were included. The information covered electric plants of all types, hydro-electric, steam and internal combustion, also transmission lines, sub-stations, distribution systems and rates. All plants

* *Third Annual Report, Commission of Conservation*, 1912, p. 43.
† *Proceedings, Canadian Electrical Association*, 1917, pp. 93, 94.

and systems supplying electric energy as public utilities for lighting, power, heating, etc., are comprised, including certain large establishments, such as pulp and paper mills and mines, where the energy produced is not exclusively used for their own industrial operations. The questions suggesting the various items desired were grouped under six different schedules, covering (1) hydraulic plants, (2) steam plants, (3) internal combustion engine plants, (4) transmission lines, (5) substations, (6) distribution systems, the appropriate form, of course, accompanying each request for information. The principal items suggested under each schedule were:

Hydraulic Plants—Dams and hydraulic works, head utilized, flow of river, utilization of storage, hydraulic troubles, power houses, turbines, generators, station transformers, demand, output, service, interruptions, costs and date of installation.

Steam and Internal Combustion Plants—Power houses, boilers, gas producers, engines and turbines, generators, fuel, service, costs and date of installation.

Transmission Lines—Situation, length, voltage, construction, losses, protection, cost.

Substations—Purchased energy, transformers, output.

Distribution—Mileage of streets covered, voltage, line transformers, consumers, connected load, costs, rates, street lighting.

The answers received were most satisfactory, but, in certain cases, delay was occasioned by subsequent correspondence to obtain additional data or to clarify apparently conflicting statements. In this connection, deep appreciation and thanks are expressed to the officials of the various organizations for their courtesy and co-operation, upon which depended the completeness of the report. Publications giving some of the data are available, but the information in these is very limited, and none of them cover Canada in a thorough manner, thus giving a wrong impression, much to the detriment of this country as to its development along electrical lines. It is felt that the present report represents the situation in a complete and thorough manner.

The information shows that there is a total of 565 electric generating plants in Canada, with an aggregate capacity of 2,107,743 h.p., and supplying not less than 752 distributing systems of varying importance, which cover some 973 places. If we group the plants according to the kinds of prime-movers, we find:

270	Hydro-electric plants, aggregating.....	1,806,618 h.p.
201	Steam plants, aggregating.....	288,202 h.p.
49	Gas* plants, aggregating.....	8,157 h.p.
45	Oil or gasolene engine plants, aggregating	4,766 h.p.
		2,107,743 h.p.

These figures give a very fair idea of the power situation, and show the unquestionable predominance of water-power over all other sources. The *Electrical World*, in its issue of June 16, 1917, stated editorially that:

* Practically all producer-gas engine plants.

"While central station managers in the United States have been rather restive since war was declared, wondering how they would weather the approaching storm, our Canadian friends have passed through the crisis unscathed. Bereft, as some of them have been, through the voluntary enlistment of fully 35 per cent of their staffs, and faced also with extraordinary difficulties of financing and of securing coal, they have met the situation manfully, and, instead of suffering loss, are enjoying a prosperity wholly undreamed of and never before equalled. Happily, almost all of the electricity used in Canada is generated from water-power, so that the scarcity and high price of fuel are not felt universally in the Dominion; but the demands for energy have been so great that all steam reserve apparatus as well had to be pressed into continuous service. In the use of electricity we have much to learn from Canada. . . . The per capita consumption of electricity in Canada is enormous. True, the manufacture of munitions has helped to swell the figures, but the total without that is still very large. The war has caused Canadians to make a virtue out of necessity in a way very much to their credit. Had selective conscription been adopted in Canada from the start, as it has been in this country, many of the highly trained and dependable men would have been spared to the companies to help carry the burden. American managers may therefore take heart. With all their anxieties and perplexities, our Canadian friends have been equal to every emergency, and, what is most encouraging, they show no sign of overwork. On the contrary, they are unusually cheerful."

Although the present survey only comprises electric plants, the comparative figures are probably true for other industries. They are undoubtedly correct where the cost of power is of importance, as this factor governs the choice of prime-movers in electric generation and distribution more than in any other industry, and it is a fair inference that the mode of operation of any particular station is, for that locality, the most economical way of producing power.

It is often pointed out that Canada is very favourably endowed with primary power resources and, except for a portion of the Middle West, either water-power or coal is found in abundance, while, in British Columbia, we have both resources; in fact, we find that some coal mines are operated by hydro-electric energy.

The situation in various parts of Canada is well illustrated by the figures in the report. We have steam and water-power in the Maritime Provinces with a predominance of the former. In Quebec, Ontario and eastern Manitoba, water-power is the dominating source of power, every large centre and most of the smaller ones being supplied by electricity produced from water-power, either through the extensive net-work of transmission lines fed from large developments or by smaller local plants. In the Middle West, large plants are steam operated, while the smaller ones use internal combustion engines. In British Columbia and western Alberta, we again find water-power predominating, but the generous coal supply in certain districts also permits considerable steam operation.

We have reason to congratulate ourselves on the type of plants found in all our large hydro-electric installations. Usually, the works are of most substantial construction, and the most expert engineering advice has

been obtained, while the equipment is in keeping and comprises both hydraulic and electrical machinery of the most efficient type. The same, unfortunately, cannot be said of many of our small plants and, particularly in the older ones, there is undoubtedly great room for improvement. The old wooden dams are usually very leaky and, especially on small streams, a considerable proportion of the flow is wasted, while the remaining water is often lost in a vain effort to operate an obsolete and inefficient water-wheel, installed years ago and never properly repaired and adjusted. In many cases, we find in these defects the real cause of a shut-down from lack of water in winter.

The same comment applies to our steam plants; the large ones, although a number of them are only used as auxiliaries, are very efficiently equipped and operated, but many of our small plants show much room for improvement. It cannot be expected, however, that a small plant will show the same efficiency and economy of operation as a large one. As auxiliary plants only operate intermittently, the question of economical operation, while most desirable, naturally does not receive the same consideration as in plants operating continuously, and the latter can stand much heavier overhead charges, so long as such charges result in increased efficiency and reduce operating costs. There are many small plants in the prairie sections, where the price of fuel is high, the majority of them using oil, gasolene or producer-gas. Considering such municipalities, and others in their vicinity which desire electric service, it would seem to be worth while to generate energy in large steam plants, situated at suitable distribution centres, and thus supply transmission systems extending to the various communities within economic radius. The larger the plant, the greater the economy, up to plants of some 50,000 k.w. or more.

In a paper read before the Institution of Civil Engineers, Mr. E. M. Lacey states* that there is considerable difference in plants up to 12,000 k.w., while the ultimate limit, beyond which no appreciable advantage would accrue by reason of concentration of plant in large power houses, may be taken at 40,000 to 50,000 k.w., but such ultimate capacity must be governed largely by the length of the transmission lines necessary to serve the area of supply.

In an article in the *Electrical World*, for May 26, 1917, Mr. Earl D. Jackson makes a comparison in economy between small local oil-engine plants and energy received from distant large steam plants, and concludes that, under the conditions that usually obtain, a transmission line 20 miles in length can compete advantageously with a small local plant.

Ownership of Plants †

The ownership of the various plants included in the report is divided into 207 municipal or publicly-owned plants of 452,508 h.p. total capacity, and 358 privately-owned plants of 1,655,235 h.p. total capacity.

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* *Times Engineering Supplement*, March 30, 1917, p. 76.

† See Table V, page 281.

Much has been said for and against municipal or public ownership, as compared with private ownership, of public utilities, the difference of opinion being most pronounced with reference to electric systems. Municipal ownership seems desirable in the case of a large plant, operated under the direction of a competent technical man, or when forming part of a large organization, and operated with the advice of a competent technical head. This is particularly important where the municipality operates the generating station, as, when energy is purchased in block, the municipality only has to look after the distribution and the case is much simpler, the burden of management falling rather on the cost accounting end of the undertaking.

Typical examples of the two kinds of ownership are furnished by two of our largest systems; the Niagara system of the Ontario Hydro-Electric Power Commission, with a total load of over 201,000 h.p., supplying some 120 municipal distributions and covering an area approximately 210 miles by 85 miles; and the system of the Shawinigan Water and Power Co., in the province of Quebec, with a total load of 205,000 h.p., supplying some 76 distribution systems directly or indirectly and covering a triangular area of 140 miles base by 75 miles in height.

The activities of the Hydro-Electric Power Commission, which are thoroughly described in the body of the report, have been a great incentive to municipal ownership in Ontario, but we also find many municipal systems in other provinces. In Quebec, for instance, while the great bulk of the energy is distributed under private ownership, there are a number of municipal systems, some obtaining their supply in block from the Shawinigan and other large non-public systems. In the Prairie Provinces, with very few exceptions, all the larger and many of the smaller systems are operated under municipal control. Commenting on municipal plants in this portion of Canada, but referring particularly to the larger centres, Mr. A. G. Christie states* that a large portion of their success is attributable to the character of the people; that, being a young man's country, all are optimistic and have a spirit of co-operation, which provides a sound basis for their municipal ownership ventures. Live interest is taken by the public in all utilities, stimulating up-to-date equipment, operation and organization. The administration of these utilities is usually in the hands of either a commissioner, a superintendent or an electrical engineer, and, when such officials are free from aldermanic interference, the utility is administered well and economically.

Size of Plants†

The plants, naturally, vary greatly in size; our largest hydro-electric development is 488,800 h.p., in the three large power plants at Niagara; the large installations are not all confined to this site, however, there being 5 plants of over 100,000 h.p. and 36 plants of over 10,000 h.p. capacity. The largest single plant is the Ontario Power Co., now operated by the Ontario Hydro-Electric

* *Proceedings, American Institute of Electrical Engineers*, 1916, vol. 35, p. 33.

† See Table IV, page 280.

Power Commission at Niagara, with a total capacity of 211,300 h.p., while the largest single unit is 20,000 h.p., at Grand'mère, Que. The average head of water utilized is not exceedingly high, but many of our large hydro-electric plants operate under fairly high heads, such as 140 to 180 ft. at Niagara, 145 ft. at Shawinigan, 83 ft. at Grand'mère and 400 ft. at the Coquitlam-Buntzen plants near Vancouver. The highest head in eastern Canada is 540 ft., at the 8,000-h.p. plant at Eugenia falls, Ont., while, in the West, we have a head of 1,820 ft. for hydro-electric purposes at Britannia Beach, B.C., where the development also provides a total head of 3,530 ft. in two steps of 1,450 ft. and 2,080 ft. for the direct operation of other machinery. On the other hand, one of our largest plants, recently installed at Cedars, Que., operates under a head of 30 feet.

The plant at Hamilton, Ont., 26,667 h.p., is the largest steam-power plant in Canada and is used as an auxiliary, while the plant at Edmonton, Alta., 14,234 h.p. is the largest steam plant operated continuously.

Although the service from hydro-electric plants, where long distance transmission is necessary, is becoming much more reliable, our investigation disclosed that many of them were provided with auxiliary steam plants. Some of these auxiliary steam plants are used, not only in emergencies, but at regular periods during certain years when low water prevents the water-power plant carrying its full load. In a recent paper Mr. H. St. Clair Putnam* expressed the opinion that practically all water-power plants should be developed beyond the minimum power available and, hence, in combination with a steam plant; also, that the economic limit depends largely on the cost of fuel and labour, the increasing efficiency of steam turbines and the location of the enterprise. The combination is justified in many cases, where, for instance, deficient water conditions for limited periods would prevent the full utilization of a water-power site without auxiliary power of some kind. Such auxiliary steam plant, however, should never be decided upon without full investigation of storage possibilities, as provision by storage as a means of providing for insufficient power due to deficient flow will, in many cases, prove more economical, and, at the same time, will conserve coal.

Conservation Reservoirs †

It is most gratifying to note the very rapid increase in the use of stored water in connection with our hydro-electric developments, both large and small, and no less than 59 plants report the successful operation of this method of providing for increased flow at low-water periods. Many difficulties encountered in the early years in connection with efficient operation seem to have been overcome by careful observation and study of conditions from year to year. By carefully regulating the release from storage reservoirs, water is successfully conveyed over long distances to the power plant and with a minimum of loss. Among government undertakings of this nature may be mentioned the three large reservoirs at lakes Timiskaming, Kipawa and

* *Proceedings, American Institute of Electrical Engineers*, June 1917, pp. 531-548.

† See Table I, page 232.

Quinze to regulate the flow of the Ottawa river; La Loutre reservoir on the St. Maurice river; lake St. Francis dam for the river of the same name; the extensive system of smaller conservation reservoirs on the Trent river, Ont., and lake Minnewanka, on the upper waters of Bow river; also the reservoirs on Jordan river and Goldstream, near Victoria, of the B.C. Electric Ry. Co. Many of the plants reporting are enthusiastic respecting results obtained from individual undertakings and, frequently, the capacity has been raised to double or more. In connection with water conservation operations, difficulties sometimes arise in apportioning among the various users the charges for the stored water. Adequate legislation governing such apportionment should suppress arbitrary or indiscriminate action. If such action were permitted it would be most detrimental to the further extension of this beneficial practice.

Trouble from Ice †

Although much has been accomplished of late years in the way of preventing or minimizing ice troubles, we still find a number of complaints respecting such difficulties. In most cases, it is probable that they could have been avoided had proper precautions been taken, but, frequently, on account of their intermittent occurrence, the requisite measures are not taken until the troubles have actually developed. Mr. J. A. Walls, in a paper on 'Frazil Ice-Handling Methods,'* presents a statement of ice-handling methods at Holtwood, Pa., on the Susquehanna river. He demonstrates that the most important factors are, (1) early knowledge of impending ice trouble and (2) preparedness.

Types of Generators ‡

Practically all energy for distribution is generated as alternating current. The types of generators comprise various phases, frequencies and voltages. All large plants and a great many of the smaller plants operate at three-phase; a number of the older plants, some of a fair size, still use two-phase, while the single-phase systems are confined to small plants which have also been installed for some time. The principal frequencies used are 60, 30 and 25 cycles, while frequencies of over 100 cycles are still found in the older plants of small size. There is naturally a great variety of generator voltages, these being adapted to suit the most economic power plant design. In plants supplying distribution systems direct at the generator voltage, we find 2,200 volts predominates; also 550 volts where a large amount of motive power is supplied near the plant; also 12,000 volts in plants where all or a portion of the energy is transmitted a certain distance at this voltage. With the exception of electric railway service and, in a few places for a portion of the industrial power service, direct current generation is practically confined to very small plants. Such plants sometimes use storage batteries to provide continuous service, while the generating units operate only a portion of the time. In this connection, storage batteries are very convenient, but often too little attention is given to the batteries. Such lack of care results in rapid deterioration and the batteries soon become

† See Table I, page 232 ‡ See Table V, page 281.

* *Proceedings of National Electric Light Association, Fortieth Convention*, 1917, p. 155.

very inefficient if not almost useless, whereas, if proper attention had been given, satisfactory service could have been expected.

Character of Loads *

The aggregate maximum demand on the plants included in this report is 1,078,298 k.w., of which 1,003,955 k.w. is on hydro-electric, 69,924 k.w. on steam, and 4,419 k.w. on internal combustion engine plants. The division between the various services, such as lighting and power, could not be obtained from all plants and systems, but available data indicate that 31 per cent is used for lighting, 59 per cent for power and 10 per cent for miscellaneous. The load factor on the larger plants is stated in the report, but, in some instances, such information respecting the smaller plants was unobtainable. For the larger hydro-electric plants, the load factor usually varies from 50 to 80 per cent, while in plants supplying large blocks for metallurgical or chemical purposes, it may reach from 90 to 100 per cent. On steam plants of fairly large size, 30 to 40 per cent power factor is usually recorded, but 60 per cent may be reached in exceptional cases where the load comprises mainly mining or other industrial operations requiring 24-hour power.

Of the various plants, 274 give a continuous service, night and day, while 220 give only a night service, but, as the latter only comprise small installations, their total capacity is relatively unimportant. The remaining 71 plants are used as auxiliaries.

Cost of Generation

It is very difficult to obtain accurate data on cost of generation which could be used to compare conditions at various plants. An attempt to keep a record of this information is made in most plants, but the manner of arriving at it varies greatly. The chief difficulty lies in the inclusion for certain plants and omission in others of various items which are comprised in the total cost given. In some cases, the overhead charges are left out, which leads to most erroneous figures, especially in hydro-electric plants; in certain steam plants, only fuel and oil costs are considered. On the other hand, some plants keep this information in a very accurate and detailed manner. Such plants include all chargeable items, sub-dividing the total cost into various parts and extend it to the transmission and distribution costs. The cost of generation for hydro-electric plants is usually given in dollars per h.p.-year, and among the lowest reported is a cost of $8.50 per h.p.-year, the plant being only some 10,000 h.p. capacity, but operating under a 90-foot head; for very large plants, the cost should be even substantially lower, while for plants of the same order it varies from $8.50 to $15 per h.p.-year; in smaller hydro-electric plants, $30 to $40 per h.p.-year may be reached. Steam plant costs are more often expressed in cents per k.w.h. and they vary greatly with the service, size of plant and with its geographic situation, as affecting the price of fuel; in steam plants of over 500 h.p. capacity, the reported generation cost varies generally

* See Table VI, page 282.

from 0·7 cent to 5 cents per k.w.h., while in smaller plants it varies from 3 to 15 cents per k.w.h.

Transmission Lines * Transmission lines in Canada operate under many different voltages up to 110,000 volts. There are only three systems using over 100,000 volts, namely, the Niagara system of the Ontario Hydro-Electric Power Commission, the Shawinigan Water and Power Co., and the Montreal Light, Heat and Power Consolidated on the line from its Cedars plant to Massena, N.Y. Lines of various voltages from 10,000 upward aggregate 5,490 miles and are as follows:

10,000 to 30,000 volts aggregate	2,428 miles
30,000 to 99,000 " "	2,485 "
100,000 volts and upwards aggregate	577 "
	—— 5,490 miles

The cost per mile of the different lines naturally varies with the mode of construction, size and number of conductors and voltage for which constructed. For voltages of from 10,000 to 50,000 volts, the figures given show a wide variation of from $600 to $11,000 per mile, while on 100,000-volt lines and over, we have from $7,500 to $14,000 per mile.

Iron wire transmission lines have been used in many instances lately, owing to the very high prices of copper and aluminium. The use of iron wire seems well adapted for short extensions and rural distribution, but, in some cases, it has also been used on fairly long lines. In a recent article, Mr. M. D. Leslie† gives examples of 22,000-volt iron transmission lines, one of them 31 miles long, for relatively light loads. Although, as the article points out, the design and operation of these lines involve certain principles different from lines of other materials, they are most satisfactory where light loads are to be carried comparatively long distances. Such lines have been found to return a fair rate on the investment, while copper, at present prices, would have debarred construction.

Distribution Data * The figures given under the heading of distribution are only meant to give a general idea of the relative extent and importance of the various systems. Many other details could have been inserted under this head, but, as they could only have been obtained respecting a very limited number of plants, the investigation would not have served the desired purpose. The number of miles of streets covered by the various systems gives an idea of the area served, while the number of consumers and connected load show the general concentration; the number and sizes of line or distribution transformers indicate, in a measure, the possibilities of local concentration. These various points are of importance in determining relative first costs and maintenance.

Of the 752 distribution systems in Canada, 389 are municipal or publicly controlled, while 363 are under private ownership. The systems included cover a total of 11,852 miles of streets and supply 730,697 consumers with

* See Table VII, page 283.
† *Electrical World*, Oct. 13, 1917, vol. 70, p. 715.

an estimated connected load of 497,846 k.w. for lighting and appliances and 970,505 h.p. for power.

Distribution Voltages

The prevalent primary voltage of distribution is 2,200 volts, or from 2,000 to 2,400 volts, but 4,000 to 6,600 volts is becoming more and more used, particularly in rural distribution and systems comprising a number of small centres within eight or ten miles of the local source of supply. A number of systems still use 1,100 volts, but practically only in old systems installed before this voltage had been superseded. Lower distribution primary voltages of from 500 to 600 volts are only used in rare instances where large power loads are supplied directly at this voltage from the local source of supply, while line transformers stepping down to 110 volts are used to supply the lighting consumers. The secondaries for lighting are usually at 110 volts or from 100 to 120 volts, but, in many cases, three-wire secondary distribution is used with 110 volts on each side. For motive power, large motors are supplied direct at the primary voltage of 2,200 volts, while, for smaller motors, the secondary voltages are usually either 220, 440 or 550 volts. With a few exceptions, direct current distribution is found only in very small systems, some taking advantage of this to utilize storage batteries to supply a continuous service.

The information relating to line transformers was not obtainable in certain cases, but, with a fair estimate of the deficient data, the total number is 61,100, giving an aggregate capacity of 607,000 k.w.

Rates *

As probably the question of rates charged to consumers will be one of great interest to those consulting this report, a word of warning is necessary to prevent the drawing of hasty conclusions when establishing comparisons in this connection. As might be expected, lower rates are generally found where hydro-electric energy is available, but rates are influenced by many extraneous circumstances. Naturally, there may be a fairly large margin between rates charged and the cost of energy at the power plant or substation, due to features of the distribution system. In some cases, it costs almost as much to distribute as it does to generate. In other instances, where the distribution system is restricted and the load confined to a small area, distribution cost may be a very small item. It is also often difficult to establish a fair comparison between various rates on account of the different systems of charging used in various places. For instance, the Ontario Hydro-Electric Power Commission has adopted a system of rates based on a fixed charge plus a meter rate varying with the consumption, in other words, a combination flat and meter rate, and a comparison with a straight flat or straight meter rate can only hold for a specific example with stated conditions and consumption. The working out of proper rates is one of the most important and intricate problems facing an electric distribution organization, and there are, doubtless, a number of cases, particularly in some of the smaller systems, where a proper policy

* See Table III, page 254.

with regard to the sale of current has not been adopted. Frequently, as a result of such mistaken policy, the maximum revenue possible is not derived from the plant. For instance, in one of our small western towns, the supply for the distribution system was contracted for in block, the municipality agreeing to take a specified minimum amount of energy. The town has never been able to dispose of this minimum amount, owing to the excessively high rates charged on the energy actually sold, which, of course, checked consumption very materially. On the other hand, had the rates been reduced, thus stimulating consumption, the energy used might have reached the minimum stipulated and the revenue would have been increased without additional cost for the block power contracted for. The town would have avoided a law suit and its citizens would have enjoyed low rates for power and lighting.

Street Lighting * Incandescent lamps, particularly since the advent of gas-filled lamps, have been replacing enclosed arc lamps for street lighting. According to the report, however, we still find enclosed arc lamps used in 73 places. The prevalent size of incandescent lamps is 100-w., while lamps of from 25 watts to 1,000 candle power, both tungsten and gas-filled, cover the range found in use. In a series of articles Mr. James R. Cravatt† gives very good data on street lighting, taking up the general principles, lamp ratings, relative costs, etc. He proves that, for street lighting, only two illuminants are to be considered at present, namely, the gas-filled incandescent and the magnetite arc lamps. The operators of certain small plants have indicated their prejudice against gas-filled lamps for street lighting, the reason given being that of short life. A study of the situation seems to indicate that, as this complaint only comes from the smaller plants, the cause of this short life is, in all probability, improper regulation, *i.e.*, too high amperage or voltage, the operator not being provided with proper station instruments to govern operation. As against this prejudice, may be cited the case of a small town in British Columbia provided with proper instruments, where rough tests of gas-filled lamps demonstrated that a very long life could be obtained by running them slightly under voltage.

The rates or charges allowed for street lighting show much variation in different places. Some of the higher rates per lamp per year, are: Luminous or magnetite arc, $95; enclosed arc, $90 to $125; 100-w. lamp, $48; 300-w. lamp, $75. Some of the lower rates per lamp per year, are: Luminous or magnetite arc, $46.51; enclosed arc, $40; 100-w. lamp, $3.30; 400-c.p. lamp, $8.40; 1,000-c.p. lamp, $50. In a number of places, the street lighting service is charged on the meter rate at so much per k.w.h.

Explanatory

The systems are designated by the name of the city, town or village served, these being classified alphabetically under each province, while the provinces are arranged geographically from east to west.

* See Table III, page 254.

† *Electrical World*. 1917, vol. 70, pp. 414, 473, 514, 565, 611, 664 and 709.

Where a number of distribution systems are supplied by the same power plant and transmission system, the latter are usually described under the most important system served; an exception to this rule was made for the plants and transmission lines of the Ontario Hydro-Electric Power Commission systems, which are described at the beginning of the section covering the province of Ontario.

Population.—The figures in brackets after the name of the place represent the population. Except where otherwise stated, the statistics of population have been extracted from the Census of 1911, except Manitoba, Saskatchewan and Alberta, which were obtained from the Census of 1916. Those with an asterisk (*) have been obtained from provincial statistics, while those with a dagger (†) have been obtained from the municipality.

The various terms occurring in the descriptions are generally meant to have the following interpretations:

Distribution Secondary Voltage—Voltage of energy, after being stepped down through line transformers, at which consumers are supplied.

Distribution Primary Voltage—Voltage from power plant or substation, requiring only to be stepped down through local or line transformers to be supplied to consumers.

Line Transformers—As distinct from station transformers, usually of smaller size and pole type.

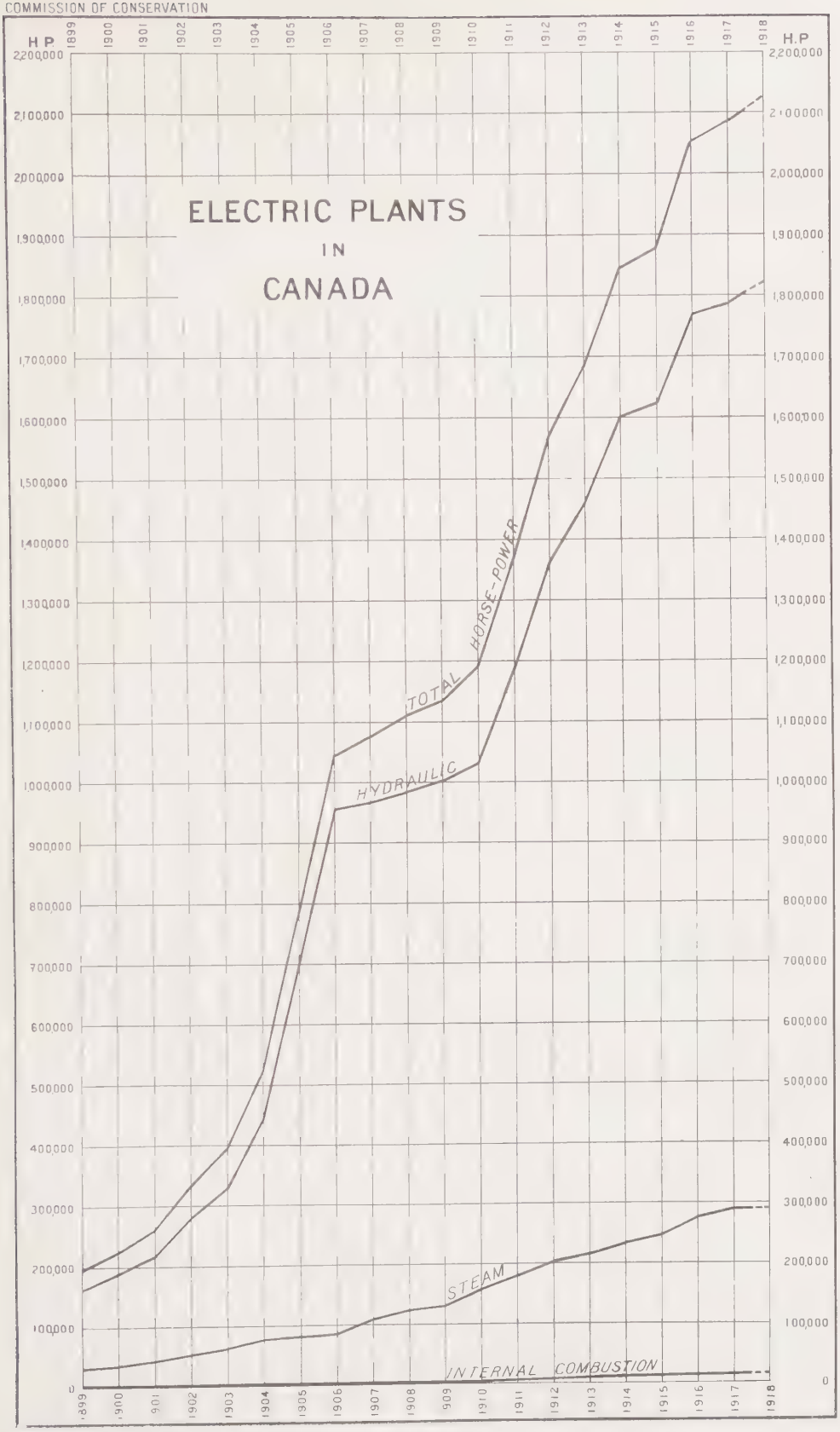
Mileage of Streets—Length of streets or roads on which consumers may be supplied; practically the total length of distribution pole lines, but *not* the mileage of single wire.

Rates—In many places, particularly on larger systems, rates vary according to a sliding scale, in which case the minimum and maximum rates only are given, while there may also be intermediate ones; the minimum rate usually only applies to comparatively large consumers, while the maximum rate, as a rule, is a better guide for an average consumer.

Transmission Lines—Lines operating usually at 10,000 volts and over, but, in a few cases as low as 6,600 volts, the energy from them being stepped down at substations to a lower voltage for distribution. A transmission line with two or more circuits on a single pole line is considered as a single line with two circuits, or more, as the case may be.

Abbreviations

a.c.	—	alternating current	k.w.	—	kilowatt
c.p.	—	candle power	k.w.h.	—	kilowatt-hour
cy.	—	cycles	mi.	—	miles
d.c.	—	direct current	ph.	—	phase
h.p.	—	horse power	v.	—	volts
k.v.a.	—	kilovolt-ampere	w.	—	watts


ELECTRIC PLANTS
IN
CANADA
H.P
2,200,000
2,100,000
2,000,000
1,900,000
1,800,000
1,700,000
1,600,000
1,500,000
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
900,000
800,000
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1910
1911
1912
1913
1914
1915
1916
1917
1918
TOTAL HORSE-POWER
HYDRAULIC
STEAM
INTERNAL COMBUSTION

NOTE:—The data included in the descriptions are based on reports of officials of the various municipalities and companies referred to in the below report. Prior to printing, the data respecting each municipality and each company was submitted to the respective responsible official of the municipality or company for verification or correction.

NOVA SCOTIA

AMHERST, Cumberland Co. (10,500). Supplied by Canada Electric Co., Ltd., which is controlled by the Maritime Coal, Railway and Power Co., Ltd., and operates, under lease, the latter's steam-power plant at Chignecto Mines, 8 mi. distant. Power is also transmitted to Joggins Mines, 12 mi. distant; Nappan, 3½ mi. distant; River Hebert, 10 mi. distant; Maccan, 3 mi. distant. It is distributed in Chignecto from the power station. **Steam Plant:** Brick and concrete power house, 140 x 85 ft., with an annex 80 x 18 ft. Equipment: 10 return tubular boilers having a total rated capacity of 1,530 h.p. at 150 lbs. pressure; two 750-h.p. cross-compound vertical high-speed engines, direct connected to two 500-k.w., 3-ph., 60-cy. generators, one at 440 v. and the other at 11,000 v.; one 1,000-k.w. steam turbine set, 3 ph., 60 cy., 2,200 v.; three 350-k.w. and two 500-k.w. station transformers stepping the voltage up from 2,200 v. to 11,000 v., 3 ph., 60 cy. Maximum demand, 950 k.w. Average load factor, 60 per cent. Cost of generation, 1·3 cents per k.w.h. Fuel: slack coal; yearly consumption, 15,888 tons, at $1.40. Plant installed, 1908. Continuous service. **Transmission Lines:** Extend from Chignecto in various directions to the places above mentioned. Transmission voltage, 11,000 v., 3 ph., 60 cy. Estimated losses, 22 per cent, when carrying 1,000 k.w. Cedar poles are used with pin type insulators supporting both solid and stranded copper conductors. Electrolytic lightning arresters. The substations have the following connected load: Amherst, for lighting, 450 k.w., for power, 2,000 h.p.; Joggins Mines, for lighting, 75 k.w., for power, 1,000 h.p.; Nappan, for lighting, 35 k.w.; River Hebert, for lighting, 10 k.w.; Maccan, for lighting, 2 k.w. **Substations:** A total of 10 station transformers in units from 50 k.w. to 500 k.w., with a total capacity of 2,600 k.w., stepping the voltage down from 11,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** For all systems 35 mi. of streets and roads, primaries at 2,200 v. and secondaries at 110 v. and 220 v., with 99 line transformers ranging from 1½ k.w. to 50 k.w. Number of consumers, 1,240. For connected load, see under transmission lines. Street lighting: tungsten lamps, 25 to 40 w. Value of distribution system in Amherst, $84,000. **Rates:** Domestic meter rate, 11 to 13 cents per k.w.h. Commercial rate, 9 to 15 cents per k.w.h.; flat rate, 55 cents for summer, and 85 cents for winter, per 16-c.p. lamp monthly. Discount for lighting rates, 10 per cent. Yearly flat power rate, $40 to $85, according to quantity. Meter power rate, 2 to 2½ cents per k.w.h., plus a yearly fixed charge of $12 to $40 per h.p. Street lighting rate, $13.75 per 25-w. lamp and $17.75 per 40-w. lamp, per year.

ANNAPOLIS ROYAL, Annapolis Co. (1,019). Supplied by municipal hydro-electric plant on Lequille brook, 1½ mi. distant. **Hydraulic Plant:** A rock-filled, crib-work dam, 250 ft. long by 18 ft. high, from which a flume, partly wood-stave and partly iron, 720 ft. long and from 40 to 49 in. in diameter, leads to a frame power house on concrete foundations, 41 x 43 ft. A head of 47 ft. is afforded. Equipment: one 240-h.p. turbine to which is belted a 100-k.w., 66-cy., 2-ph., 2,500-v., generator and exciter. Maximum load is 70 k.w. Storage of water is sometimes resorted to in Grand lake, some 7 miles above the power house, with satisfactory results. In future, it is intended to utilize this systematically. Value of plant, $23,000. Plant installed, 1902. Night service only. **Distribution:** 3½ mi. of streets; primaries at 2,200 v. direct from the power house; and secondaries at 104 v.; 17 line transformers, ranging from 1½ to 7½ k.w. Number of consumers, 130. Street lighting: 48 tungsten lamps of 40 and 60 w. at a total cost of $300. **Rates:** A flat rate of from 16 to 30 cents per 16 c.p. per month for domestic lighting and from 26 to 40 cents per month for commercial lighting, according to number.

See page 12 for explanation of abbreviations used in this report.

NOTE—Except where otherwise stated, the statistics of population have been extracted from the Census of 1911.

† Population statistics with a dagger have been obtained from the municipality.

ANTIGONISH, Antigonish Co. (1,787). Supplied by steam power plant of the Antigonish Electric Light Co. **Steam Plant:** Brick power house, 70 x 25 ft. Equipment: one 95-h.p, return tubular boiler at 125 lbs. pressure, one 90-h.p. engine belted to two 45-k.w. generators and one 25-h.p. engine belted to a 15-k.w. generator; all energy generated at 125 v., d.c. One reserve engine, 60 h.p. Maximum load, 50 k.w. Fuel: Sydney run-of-mine coal; yearly consumption, 740 tons at $5.90. Plant installed, 1892; equipment renewed, 1914. Value of plant, including distribution system, $16,950. Night service only. **Distribution:** 3 mi. of streets, at 110 and 220 v., 3 wires, d.c. Number of consumers, 225, with a connected load of 200 k.w. for lighting, 7 h.p. in motors and 12 k.w. in appliances. Street lighting, 40-w. tungsten lamps. **Rates:** Meter lighting rate, 16 to 18 cents per k.w.h., according to consumption, less a discount of 10 per cent. Monthly flat rate, 30 to 60 cents per lamp, according to number and uses. Street lighting rates, $14.30 per 40-w. lamp per year.

BEAR RIVER, Digby Co. Supplied by hydro-electric plant of the Bear River and Digby Electric Light, Heating and Power Co., Ltd., on West branch of Bear river, 1 mi. distant. **Hydro-electric Plant:** One 60-h.p. Pelton wheel, to which is belted a 50-k.w., 3-ph., 60-cy., 2,300-v., generator. Available head, 70 ft. Maximum load, 50 k.w. Night service only. Water storage is resorted to in three lakes with good results. Value of power plant, $6,200. Cost of operation, excluding interest and depreciation, $1,811.72. Gross earnings, $2,533.28. Plant installed, 1899; a new generator was substituted in 1912. **Distribution:** 6 mi. of streets and roads; primaries at 2,300 v., house lighting at 110 v. Cost of distribution system, $9,000. **Rates:** Flat rate, $2.20 to $6.00 per year per light of 40 w., according to number.

BRIDGETOWN, Annapolis Co. (996). Supplied from hydro-electric plant of Bridgetown Electric Light and Power Co., Ltd., 2 mi. distant on the Currel brook, which discharges Corbet lake, on South mountain. **Hydro-electric Plant:** A dam, 30 ft. long by 15 ft. high, with wooden flume, 16 in. in diameter and 2,900 ft. long, leading to a frame power house, 20 x 35 ft. Equipment: one 175-h.p. Pelton wheel belted to a 90-k.w., single-phase, 60-cy. 2,300-v. generator. Head utilized, 250 ft.; this could be materially increased. Plant installed, 1905. Value, $23,000. Night service only. Maximum load, 65 k.w. No trouble from shortage of water. **Distribution:** 5¾ mi. of streets and roads supplied direct from generating station, primaries at 2,300 v. and house lighting at 110 v., with 15 line transformers having an aggregate capacity of 61 k.w. and ranging from ½ to 10 k.w. Number of consumers,160, giving a connected load of 65 k.w. Street lighting: 40-w. lamps. Value of distribution system, including line transformers, $5,746. **Rates:** Flat rate of 1 to 3 cents per 16-c.p. lamp per night, according to number and uses. Street lighting rate, $18 per 40-w. lamp per year.

BRIDGEWATER, Lunenburg Co. (2,775). Supplied by municipal hydro-electric plant on Petite river at Hebbville. **Hydro-electric Plant:** Earth dams, ¾ mi. long by 8 ft. high, and two concrete dams, each 125 ft. long by 11 ft. high, with steel flume, 8 ft. in diameter, 225 ft. long, leading to a frame power house on concrete foundations, 35 x 65 ft. Available head, 25 ft. Equipment: one 319-h.p. turbine belted to a 200-k.w., 2-ph., 60-cy., 2,200-v. generator. Maximum load, 132 k.w. Night service only. Slight trouble sometimes experienced from anchor ice and spring freshets. Plant renewed in 1907. Value, including distribution system, $82,000. **Distribution:** 20 mi. of streets and roads (including supply line), supplied direct from power plant; primaries at 2,200 v. and secondaries at 110 v., with 50 line transformers ranging from 1 to 5 k.v.a. Number of consumers, 400, giving a connected load of 200 k.w. Street lighting, 32-c.p. and 60-w. lamps. **Rates:** Flat lighting rate, $1 to $5 per lamp per year, according to number and uses.

CANSO, Guysborough Co. (2,000†). Supplied by municipal producer-gas plant. **Power Plant:** Frame power house, 30 x 50 ft. Equipment: gas producer and engine of 95 h.p.,

belted to a 62-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 45 k.w. Fuel: anthracite coal; yearly consumption, 150 tons, at $10.75. Night service only. Plant installed, 1914. Value, $13,000. **Distribution:** 7 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v., with 18 line transformers, having a total capacity of 62 k.v.a. Number of consumers, 170, giving a connected load of 85 k.w. Street lighting, 40-w. lamps. Value of distribution system, $7,000. **Rates:** Meter rate, 18 cents per k.w.h., less discounts of from 10 to 20 per cent, according to consumption. Street lighting, $7 per 40-w. lamp per year.

CHEGOGGIN, Yarmouth Co. Supplied by the Yarmouth Light and Power Co. See under Yarmouth.

DARTMOUTH, Halifax Co. (7,500†). Supplied by Dartmouth Gas, Electric Light, Heating and Power Co., Ltd. Street lighting supplied by a municipal water-power plant.

Dartmouth Gas, Electric Light, Heating and Power Co., Ltd.—Four hundred h.p. purchased in block from Nova Scotia Tramway and Power Co. (see under Halifax), at 2 cents per k.w.h. **Substations:** Two; equipped with three 125-k.w. and three 75-k.w. station transformers, the former stepping the voltage down from 13,200 to 550 v., and the latter from 13,200 to 2,200 v., 3 ph., 60 cy. Thirty per cent of energy supplied is used for lighting and 70 per cent for power. **Distribution:** 13 mi. of streets and roads, primaries at 2,200 v. and secondaries at 110 v. to 550 v., with 31 line transformers having a total capacity of 312 k.w. Number of consumers, 730, giving a connected load of 440 k.w. for lighting, 560 h.p. in motors and 100 k.w. in appliances. **Rates:** Meter lighting rate, 12 cents per k.w.h., less 20 to 25 per cent discount. Power rate, 8 cents per k.w.h., less 25 to 55 per cent discount, according to consumption and length of contract.

Municipal Street Lighting System—Power Plant: Operated by water-power supplied through town mains, from Lamont lake, 3 mi. distant, at a pressure of 75 lbs. Frame power house, 12 x 35 ft., contains a 30-h.p. Pelton wheel belted to a 30-k.w., 3-ph., 60-cy., 2-300-v. generator. **Distribution:** 12 mi. of streets with 208 tungsten lamps of 40 w. and 60 w. Yearly street lighting charge, $1,800. Value of plant and distribution system (approximate), $9,000.

DIGBY, Digby Co. (1,247). Supplied by steam plant of J. Daley & Son. **Steam Plant:** Frame power house, 25 x 75 ft., containing one 150-h.p. return tubular boiler at 125 lbs. pressure and one 136-h.p. compound engine to which is belted a 58-k.w., single-phase, 2,300-v. generator. Maximum load, 39 k.w. Fuel: run-of-mine coal; yearly consumption, 425 tons at $7.75. Value of plant, $25,000. Cost of generation, 3¾ cents per k.w.h. Plant installed, 1891. Night service only. **Distribution:** 5 mi. of streets; primaries at 2,300 v. and secondaries at 110 v., with 18 line transformers ranging from 2½ k.w. to 7½ k.w. Number of consumers, 175, giving a connected load of 100 k.w. Street lighting, 40-w. tungsten lamps. **Rates:** Meter rate, 20 cents per k.w.h., less discounts of 12½ to 20 per cent. Street lighting, $14.50 per 40-w. lamp per year.

DOMINION, Cape Breton Co. (2,589†). Supplied under municipal control, obtained in block from Cape Breton Electric Co. (see under Sydney) at 6 cents per k.w.h. **Distribution:** 4 mi. of streets; primaries at 2,300 and secondaries at 110 v., with 10 line transformers having a total capacity of 47 k.w. Number of consumers, 200, giving a connected load of 100 k.w. for lighting. Street lighting, 60-w. lamps. Value of distribution system, $10,000. **Rates:** Meter rate, 10 cents per k.w.h.

GLACE BAY, Cape Breton Co. (17,000†). Supplied by municipal steam-power plant. **Steam Plant:** Brick power house, 40 x 90 ft. Equipment: four 150-h.p. return tubular and Robb-Mumford boilers at 125 lbs. pressure. One 400-h.p., tandem compound Corliss engine, direct connected to a 250-k.w. generator, and a 260-h.p. engine, belted to a 150-k.w.

generator, both generators being 2 ph., 60 cy., 2,200 v. Maximum load, 254 k.w. **Fuel:** bituminous coal; yearly consumption, 2,600 tons at $2.75. Cost of current at switch-board, 3.54 cents per k.w.h. Continuous service. Plant installed, 1901. Value, $98,000. **Distribution:** 20 mi. of streets, primaries at 2,200 and secondaries at 110 v., with 78 line transformers ranging from 1 k.v.a. to 25 k.v.a. Value of distribution system, $34,000. Number of consumers, 1,100, giving a connected load of 750 k.w. in lighting and 40 h.p. in motors. Streets lighted with 60-w. and 100-w. lamps. **Rates:** Flat lighting rate, for domestic use, 25 cents to 33 cents and for commercial use, 40 cents to 50 cents per 16-c.p. lamp per month, according to number and uses. Meter rate, 10 cents per k.w.h., plus a rental of 25 cents per month. Street lighting, $12 for 60-w. and $14 for 100-w. lamps per year.

HALIFAX (46,619). Supplied by steam-power plant of Nova Scotia Tramways and Power Co., Ltd. A large amount of energy is also supplied for street railway purposes, and some is also transmitted to Dartmouth (which see) for distribution. **Steam Plant:** Brick power house, 120 x 145 ft., containing 14 water-tube boilers, seven of which are of 300 h.p. with automatic stokers, and seven of 350 h.p. with chain grates, giving a total capacity of 4,550 h.p. at 160 lbs. pressure; steam turbine units, one of 2,000 k.v.a. and the other of 3,000 k.v.a., and two 860-h.p. Corliss engines, each direct connected to a 670-k.v.a. generator. All energy is generated at 3 ph., 60 cy., 2,300 v. Fuel: run-of-mine coal at $6 per ton and slack coal at $5.75 per ton, mostly the former; daily coal consumption, 42½ tons. Maximum demand, 3,200 k.w. with a load factor of 28.5 per cent. Of the energy generated, 48 per cent is used for lighting and commercial power, 41 per cent for street railway and 11 per cent for street lighting. Cost of power plant, exclusive of land, $850,000. Cost of generation, 1·3 cents per k.w.h. Continuous service. Plant installed, 1902; numerous additions have been made since. Street railway is supplied with d.c. energy from five motor generator sets having a total capacity of some 1,500 h.p. **Transmission Line to Dartmouth:** 350 k.w. at 13,200 v., 3 ph., 60 cy., is transmitted over a line 4 miles in length, consisting of one circuit of three No. 4 copper conductors supported by pin-type insulators on wooden poles. Electrolytic arresters are used at each end. A submarine cable one-half mile long is used in spanning the harbour. **Distribution** (for Halifax): 52 mi. of streets; primaries at 2,300 and secondaries at 220 v. and 110 v., with 337 line transformers ranging from 1½ k.v.a. to 75 k.v.a. Number of consumers, 5,360, giving a connected load of 3,600 k.w. for lighting and appliances and 1,365 k.w. in motors. Value of distribution system (estimated), $250,000. Street lighting, d.c. luminous and a.c. arc lamps. **Rates:** Meter lighting rate, 10 cents per k.w.h., less 10 to 35 per cent discount. Meter rate for power, 8 cents per k.w.h., less from 25 to 55 per cent discount. All discounts are governed by consumption and length of contract. Street lighting rate, $95 for d.c. luminous and $62.50 for a.c. arc lamps, per year.

HANTSPORT, Hants Co. (686). The steam-power plant of Hantsport Fruit Basket Co., Ltd., supplies 30 h.p. to municipal distribution system for $2,500 per year. **Steam Plant:** Concrete power house, 27 x 37 ft., containing one 100-h.p. return tubular boiler at 125 lbs. pressure and a 75-h.p. engine belted to a 62-k.v.a., 3-ph., 60-cy., 2,200 v. generator. **Fuel:** for winter, 186 tons slack coal at $5.15; for remainder of year, mill refuse. Maximum load, 34 k.w. Night service only. Plant installed, 1914. Value of plant, $4,200. Cost of generation, approximately 15 cents per k.w.h. **Distribution:** 5 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v., with 12 line transformers, having a total capacity of 35 k.w. Number of consumers, 72, giving a connected load of 50 k.w. Street lighting: 40-w. tungsten lamps. Value of distribution system, including generator equipment, $5,200. **Rates:** Meter rate, 15 cents per k.w.h., plus a meter rental with monthly minimum charge of $1.

HEBRON, Yarmouth Co. Supplied by Yarmouth Light and Power Co. See under Yarmouth.

INVERNESS, Inverness Co. (2,719†). Supplied by steam plant of Inverness Railway and Coal Co. **Steam Plant:** Metal-covered frame power house, 52 x 112 ft., containing 8 water-tube boilers each of from 212 to 250 h.p., with a total capacity of 1,798 h.p. at a pressure of 125 lbs. The boilers also supply steam to various apparatus used in the company's mine. Electric generating unit: one 75-h.p. engine direct connected to a 50-k.w., 125-v., d.c. generator. Maximum load, 38 k.w. Night service only. Electric plant installed, 1902; value, $6,300. **Distribution:** 1 mi. of streets, the distribution being at 125 volts, d.c. Street lighting, 50-w. lamps. Value of distribution system, $2,000. **Rates:** Monthly flat rate, 40 to 45 cents per 25-w. lamp. Street lighting rate, 90 cents per 50-w. lamp.

JOGGINS MINES, Cumberland Co. Supplied by Canada Electric Co., Ltd. See Amherst.

KENTVILLE, Kings Co. (2,500†). Supplied by steam plant of Kentville Electric Light and Power Co., Ltd. **Steam Plant:** Power house, 40 x 50 ft., containing two 90-h.p. return tubular boilers, operating at 140 lbs. pressure; and a 120-h.p. engine belted to a 75-k.w., 2,200-v., a.c. generator. Night service only. Maximum load exceeds capacity of plant. **Fuel:** culm coal; yearly consumption, 600 tons, at $5. Plant installed, 1891, Value of plant, $22,000. **Distribution:** 4½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v., with 16 line transformers ranging from 2 k.w. to 15 k.w. Number of consumers, 225, giving a connected load of 110 k.w. Street lighting: 60-w. tungsten lamps. Value of distribution system, $2,500. **Rates:** Meter rate from 10 to 14 cents per k.w.h. plus a monthly rental of 25 to 35 cents for large meters. Flat rate, $5.00 to $7.50 per light per year. Street lighting rate, $18 yearly for each 60-w. light.

LAWRENCETOWN, Annapolis Co. Supplied by municipal steam-power plant. **Steam Plant:** Steel-covered frame power house, 12 x 18 ft. Equipment: one 60-h.p. boiler at 100 lbs. pressure and one 40-h.p. engine belted to a 30-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 9 k.w. Fuel: wood; yearly consumption, 365 cords, at $5. Night service only. Plant installed, 1914. Value, $1,200. **Distribution:** Upwards of 3 mi. of streets; primaries at 2,200 v. and secondaries at 112 v., with 10 line transformers, having a total capacity of 25 k.w. Number of consumers, 95, giving a connected lighting load of 30 k.w. Street lighting, 40-w. tungsten lamps. Value of distribution system, $1,300. **Rates:** Yearly flat rate, 90 cents to $2.40 per lamp, according to number.

LIVERPOOL, Queens Co. (2,109). Supplied by municipal hydro-electric plant on Liverpool river. **Hydro-Electric Plant:** One stone and gravel dam, 2,600 ft. long and 16 ft., maximum height, and one wooden dam, 350 ft. long by 6½ ft. high, whence water is led through a wooden flume, 200 x 30 x 12 ft., ending in a wooden penstock, 24 ft. long, to a metal-covered frame power house, 100 x 34 ft. Available head, 21 ft. Equipment: one 750-h.p. turbine belted to two 225-k.w., 2-ph., 60-cy., 2,400-v. generators. Maximum load, 225 k.w. Continuous service, except on Sundays. Plant installed, 1900. Value, $92,352. **Distribution:** 5 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v., with 65 line transformers, ranging from 1 k.w. to 15 k.w. Connected load, 150 k.w. for lighting and appliances, and 100 h.p. in motors. Street lighting, 30 arc lamps and 75 tungsten lamps of 40 w. **Rates:** Yearly flat lighting rate, $1.50 to $5.00 per 16-c.p. lamp, according to number and use. Flat rate for power, $15 to $20 per h.p.-year, according to amount. Street lighting, $1,000 per year.

LUNENBURG, Lunenburg Co. (2,683†). Supplied by hydro-electric plant of Lunenburg Gas Co., Ltd., on Mushamush river, 1 mi. above Mahone and 8 mi. from Lunenburg. **Hydro-electric Plant:** A wooden and concrete dam, 300 ft. long by 22 ft. high, with adjacent frame power house, 30 x 20 ft. Available head, 22 ft. Equipment: one 400-h.p. turbine belted to a 200-k.w., 3-ph., 60-cy., 3,500-v. generator. Plant installed, 1898. Value, including distribution system, $70,000. Night service only. **Distribution:** There are 13 mi. of streets and roads, including supply line, supplied direct from power plant at 3,500 v.;

primaries at 3,200 v. and secondaries at 110 v. to 220 v., with 15 line transformers, having a total capacity of 116 k.w. Number of consumers, 400, giving a connected load of 160 k.w. for lighting and 20 k.w. for appliances. Street lighting, 40-w. tungsten lamps. **Rates:** Flat rate, $2 to $5 per 16-c.p. lamp per year. Meter rate, 10 cents per k.w.h., plus a meter rental. Street lighting rate, $12 per 40-w. lamp per year.

MACCAN, Cumberland Co. Electric energy is supplied by Canada Electric Co., Ltd. See under Amherst.

MAHONE, Lunenburg Co. Supplied under control of a public commission from hydro-electric plant at Oakland lake, 2½ mi. distant. **Hydro-electric Plant:** A stone-filled crib dam, 100 ft. long by 6 ft. high, with an iron conduit, 18 in. in diameter and 300 ft. long, leading to a frame power house, measuring 20 x 20 ft. Available head, 60 ft. Equipment: one 50-h.p. turbine, belted to a 33-k.w. single-phase, 60-cy., 2,200-v. generator. Maximum load, 20 k.w. Night service only. Plant installed, 1900. Value, including distribution system, $12,000. **Distribution:** 4½ mi. of streets and roads, including the supply line from the plant; primaries at 2,200 v. and secondaries at 110 v. and 220 v., with 12 line transformers, having a total capacity of 38 k.w. Number of consumers, 115, giving a connected load of 37 k.w. All the energy is used for lighting. Street lighting, 40-w. tungsten lamps. **Rates:** Flat rate, $3 to $5 per lamp per year, according to uses. Meter rate, 10 cents per k.w.h. Street lighting rate, $8 per 40-w. lamp per year.

MIDDLETON, Annapolis Co. (900†). Supplied from municipal hydro-electric plant on the Nictaux river at the fall of the same name, 4 mi. south of town. The municipality previously used a producer-gas plant of 66 h.p. capacity. **Hydro-electric Plant:** Concrete dam, 225 ft. long by 4 ft. high, with a wooden flume, 6 x 8 ft. section and 400 ft. long, leading to a frame power house on concrete foundation, measuring 24 x 28 ft. Available head, 32 ft. Equipment: one 250-h.p. turbine, belted to a 150-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 50 k.w. Night lighting service only. Plant installed, 1917. Value, $13,500. **Distribution:** The system is supplied directly from the power plant at 2,200 v., including the supply line, it covers 11½ mi. of streets and roads, and is supplied directly from power plant; primaries at 2,200 v. and secondaries at 110 v., with 23 line transformers, having a total capacity of 124 k.w. Number of consumers, 144. Street lighting, 40-w. tungsten lamps. Value of distribution system, $8,500. **Rates:** Meter rate, 15 cents per k.w.h. Street lighting rate, $12 per 40-w. lamp per year

MILFORD, Hants Co. (500). Supplied by Stewiacke Electric Light and Power Co. See under Stewiacke.

NAPPAN, Cumberland Co. Supplied by Canada Electric Co., Ltd. See under Amherst.

NEW GLASGOW, Pictou Co. (6,383). Supplied from Stellarton system. See under Stellarton.

NORTH SYDNEY, Cape Breton Co. (5,418). Supplied by Cape Breton Electric Co., Ltd. See under Sydney.

OVERTON, Yarmouth Co. Supplied by Yarmouth Light and Power Co. See under Yarmouth.

OXFORD, Cumberland Co. (1,392). Supplied by Oxford Electric Light and Power Co., from a combined hydro-electric and steam plant on Philip river, 2 mi. distant. **Hydro-electric Plant:** A concrete dam, 200 ft. long by 8 ft. high, with an open canal, 3,200 ft. long and 30 ft. wide, leading to a frame power house, measuring, 32 x 62 ft. Available head, 20 ft. Equipment: one 400-h.p. turbine, belted to a 175-k.w., 3-ph., 60-cy., 2,200-v. generator.

Maximum load, 150 h.p., of which 67 per cent is used for lighting and 33 per cent for power. Continuous service. Plant installed, 1911; improvements have been made since. Value, including steam plant and distribution system, $60,000. **Steam Plant:** Situated in an adjacent frame building, 54 x 30 ft., and opening into the hydraulic plant. It includes one 150-h.p. tubular boiler at 125 lbs. pressure and a 150-h.p. engine, belted to a 100-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: mill refuse. Plant installed, 1917. Is operated only as an auxiliary. **Distribution**, including Oxford Junction: 10 mi. of streets and roads, including supply lines from power plant; primaries at 2,200 v. and secondaries at 110 v. and 220 v., with 18 line transformers, having a total capacity of 150 k.w. Number of consumers, 130, giving a connected load of 60 k.w. for lighting and 90 h.p. in motors. Street lighting, 60-w. tungsten lamps. **Rates:** Meter lighting rate, 12 cents per k.w.h. Monthly flat lighting rate, 8 to 50 cents per lamp, according to number. Street lighting rate, $8 per 60-w. tungsten lamp per year.

OXFORD JUNCTION. See under Oxford.

PARRSBORO, Cumberland Co. (2,856). Supplied by municipality. **Steam-power Plant:** Frame power house, 40 x 80 ft. Equipment: two tubular boilers of 100-h.p. and 150-h.p., respectively, at 125 lbs. pressure, and two 70-h.p. engines belted, respectively, to a 45-k.w., single-phase generator, and a 50-k.w., 2-ph. generator, the energy being generated at 133 cy., 2,200 v. Maximum load, 45 k.w. Fuel: culm coal; yearly consumption, 1,000 tons at $3.65. Night service only. Plant installed, 1897. Value, including distribution system, $18,000. **Distribution:** 3 mi. of streets, primaries at 2,200 v. and secondaries at 104 v., with 18 line transformers, having a total capacity of 60 k.w. Number of consumers, 180, giving a connected load of 120 k.w. for lighting and 10 k.w. in appliances. Street lighting, 40-w. tungsten lamps. **Rates:** Meter rate, 10 cents per k.w.h., plus a meter rental.

PICTOU, Pictou Co. (3,179). Supplied by municipal steam-power plant. **Steam Plant:** Brick power house, 72 x 32 ft. Equipment: three 125-h.p. return tubular boilers at 150 lbs. pressure, one 289-h.p. compound condensing engine direct connected to a 125-k.w. generator, and one 290-h.p. Corliss engine direct connected to a 156-k.w. generator. All the energy is generated at 3 ph., 60 cy., 2,300 v. Maximum load, 176 k.w.; average yearly load factor, 28 per cent. Cost of generation, 4½ cents per k.w.h. Fuel: culm and run-of-mine local coal; yearly consumption, 3,000 tons at $2.65 for the former and $3.75 for the latter. Continuous service. Plant installed 1904. Value, including distribution system, $61,600. **Distribution:** 13½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v., with 40 line transformers, having a total capacity of 261 k.w. Number of consumers, 425, giving a connected load of 70 k.w. for lighting, 182 h.p. in motors and 50 k.w. in appliances. Street lighting, enclosed arc, 400-w. nitro and 100-w. tungsten lamps. **Rates:** Domestic meter lighting rate, 15 cents per k.w.h., less 33 per cent discount. Commercial meter lighting rate, 16 cents per k.w.h., less 25 per cent discount. Both rates subject to a minimum and to a meter rental. Power meter rate, 3 to 8 cents per k.w.h., according to restrictions, with a minimum charge of $1 per h.p. per month. Street lighting rate, $40 for each arc or 400-w. nitro lamp, and $17 for each 100-w. lamp, per year.

RESERVE MINE, Cape Breton Co. Supplied by Cape Breton Electric Co., Ltd. See under Sydney.

RIVER HEBERT, Cumberland Co. Supplied by Canada Electric Co., Ltd. See under Amherst.

SHELBURNE, Shelburne Co. (1,435). Supplied by municipal hydro-electric plant on the Roseway river in town. **Hydro-electric Plant:** A wooden, stone and earthen dam, 400 ft. long by 11 ft. high, with two iron conduits, each 5 ft. in diameter and 40 ft. long, leading to a frame power house, 30 x 60 ft. Available head, 28 ft. Equipment: two 200-h.p.

turbines, each belted to a 175-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 200 h.p. Continuous service. Plant installed, 1910. Value, including distribution system, $32,000. **Distribution:** 6½ mi. of streets, primaries at 2,200 v. and secondaries at 110 v. and 220 v., with 36 line transformers, having a total capacity of 200 k.w. Number of consumers, 120, giving a connected load of 75 k.w. for lighting and 105 h.p. in motors. Street lighting, 40-w. lamps. **Rates:** Yearly flat lighting rate, $2 per 16-c.p. lamp. Yearly flat power rate, $18 per h.p.

SHUBENACADIE, Hants Co. Supplied by Stewiacke Electric Light and Power Co. See under Stewiacke.

SPRINGHILL, Cumberland Co. (5,713). Supplied by steam plant of Edison Electric Light and Power Co., Ltd. **Steam Plant:** Brick power house, 59 x 30 ft., and steel-covered frame extension, 40 x 30 ft. Equipment: two 150-h.p. Robb-Mumford boilers; one 300-h.p. engine, direct connected to a 187-k.w., 2-ph., 60-cy., 2,300-v. generator, and one 150-h.p. tandem compound, and one 60-h.p. simple engine belted, respectively, to one 120-k.w. and one 45-k.w., single-ph., 60-cy., 2,300-v. generator. Night service only. Fuel: culm coal; yearly consumption, 1,600 tons, at $3.30. Maximum load, 190 k.w.; yearly output, 275,000 k.w.h. Plant installed, 1892, rebuilt, 1909. Value, including outside distribution system, $35,000. Cost of generation, exclusive of interest (approximate), $50 per h.p. per year. **Distribution:** 7 mi. of streets, supplied direct from power station; primaries at 2,300 v. and secondaries at 110 v., with 46 line transformers, of from 2½ k.w. to 10 k.w., having an aggregate capacity of 232 k.w. Number of consumers, 614, for lighting only; connected load, 300 k.w. **Rates:** Meter rate, 10 cents to 12 cents per k.w.h. Flat rate, maximum of 1 cent per watt per month, decreasing by sliding scale as the number of lights increases. Street lighting, 40-w. and a few 100-w. tungsten lamps at an average of $11 per lamp per year.

STELLARTON, Pictou Co. (3,910). Supplied by Pictou County Electric Co.'s electric plant in Stellarton, which also supplies energy for railway purposes and to New Glasgow, Trenton and Westville. **Steam Plant:** Brick power house, 80 x 80 ft., containing one 300-h.p. and two 365-h.p. water tube boilers, three 150-h.p., and three 125-h.p. return tubular boilers, all operating at a pressure of 150 lbs. The engines vary in capacity from 125 h.p. to 500 h.p. and aggregate 2,225 h.p. They are of various types, including both vertical and horizontal high speed, while one of the large ones is compound. All generating units are direct connected. There are four 3-ph., 60-cy., 2,280-v. generators, with capacities of 125 k.v.a., 250 k.v.a. and two of 300 k.v.a., respectively. Three other generators, two of 100 k.w. and one of 300 k.w., supply direct current for railway purposes at 550 v. There are also two 38-h.p. direct connected exciter units. Continuous service. Fuel: bituminous coal; yearly consumption, 9,000 tons at $3.75. Maximum demand, 450 k.w. for lighting and 350 k.w. for electric railway purposes. Cost of generation, 2·1 cents per k.w.h. Plant installed, 1904; enlarged, 1909 and 1914. Approximate value, $190,000. **Distribution:** 26 mi. of streets supplied directly from power plant; primaries at 2,300 v. and secondaries at 220 v. and 110 v., with 161 line transformers, ranging in capacity from ·6 to 25 k.w. Number of consumers, 1,800, giving a connected load of 890 k.w. for lighting, and 189 k.w. for power. Street lighting, 60-w. tungsten and 450-w. gas-filled lamps. **Rates:** Meter rates only are in force. Lighting rate, 15 cents per k.w.h., less discounts of 16⅔ to 33⅓ per cent. Power rate, 10 cents per k.w.h., less 10 to 25 per cent discount. Street lighting rate, $11 for each 60-w. tungsten lamp, and $55 for each 450-w. gas-filled lamp, per year.

STEWIACKE, Colchester Co. (633). Supplied by steam-power plant of Stewiacke Electric Light and Power Co., Ltd., operated in connection with a saw mill. This company also supplies Shubenacadie and Milford, the data covering these systems being included in the following description: **Steam Plant:** Equipment used exclusively for electric generation—one 85-h.p. and a 150-h.p. return tubular boiler at 110 to 125 lbs. pressure, and one 125-h.p. engine belted to a 50-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 40 k.w.

Fuel: wood; yearly cost, $1,450. Value of plant, $10,000. **Distribution:** 15 mi. of streets and roads, including the line to Shubenacadie and Milford, supplied directly from power plant; primaries at 2,300 v. and secondaries at 110 v., with four line transformers, having an aggregate capacity of 29 k.w. Number of consumers, 100. Street lighting, 60-w. lamps. **Rates:** Monthly flat rate, 17 to 75 cents per lamp of 25 to 40 w. Street lighting rate, $12 per 60-w. lamp per year.

SYDNEY, Cape Breton Co. (17,723). Supplied by steam-power plant of Cape Breton Electric Co., Ltd. A small amount of energy is also purchased from the Dominion Coal Co., Ltd. The former company also supplies North Sydney, Reserve Mine and other mining centres and sells in block to Dominion municipal system. A large portion of its energy is also used for electric railway purposes. **Steam Plant:** Brick power house, 50 x 95 ft., with an addition, 61 x 65 ft., for boiler room and coal storage. Equipment: six 150-h.p. return tubular boilers at 130 lbs. pressure; one 625-k.v.a. turbo unit; three 400-h.p. compound engines, one of which is direct connected to a 300-k.w., a.c. generator, another belted to a 300-k.w., a.c. generator, and the third, direct connected to a 300-k.w., 550-v., d.c. generator. All a.c. energy is generated at 2 ph. 60 cy., 2,200 v. Four 250-k.v.a. station transformers step the voltage up from 2,200 v., 2 ph. to 22,000 v., 3 ph. A 300-k.w. motor generator set is used for electric railway purposes. Continuous service. Maximum load, 2,156 k.v.a.; with an average load factor of 35 per cent. Of the output, 48 per cent is used for lighting and power and 52 per cent for electric railway purposes. Fuel: local coal; yearly consumption, 9,000 tons. Plant taken over by present company in 1901 but had been in operation previously. Value of the various properties, including transmission lines, distribution systems, railway and ferries, $3,125,906. **Transmission Lines:** These are 35 mi. long and extend to North Sydney, Reserve Mine and other mining centres. They operate at 22,000 v., 3 ph., 60 cy., and consist of a single circuit of three copper conductors, both No. 4 and No. 6 being used, supported by pin-type insulators on wooden poles. The lightning protection comprises both multigap and aluminum arresters. Principal sub-stations supplied: North Sydney, with a demand of 400 k.v.a., Reserve Mine, with 500 k.v.a., and Middle Lake, with 125 k.v.a. **Distribution,** all systems: 55 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v., with 228 line transformers, ranging from ½ k.w. to 25 k.w. Number of consumers, 2,397, giving a connected load of 1,470 k.w. for lighting, 670 h.p. in motors, and 385 k.w. in appliances. **Rates:** Meter lighting rate, 12 cents per k.w.h., less 5 per cent to 25 per cent discount, according to consumption. Special outdoor lighting rate, 5 cents per k.w.h. Flat lighting rate, 75 cents to $1 per 60-w. lamp per month. Meter heating appliance rate, 5 cents per k.w.h., with a minimum charge plus a meter rental. Meter power rate, 3¼ to 10 cents per k.w.h., according to consumption, less 10 per cent discount, plus a meter rental. Street lighting rate, $19.09 and $62.62 per year per 40-c.p. and 200-c.p. lamp, respectively.

SYDNEY MINES, Cape Breton Co. (8,780†). Supplied by steam power plant of Sydney Mines Electric Co. Energy is also obtained in block from Nova Scotia Steel and Coal Co.

Sydney Mines Electric Company—Steam Plant: Brick and concrete power house, 60 x 120 ft. Equipment: one 260-h.p. and one 150-h.p. water-tube boiler at 150 lbs. pressure; one 400-h.p. Corliss engine belted to a 160-k.v.a. generator, and one 125-h.p. engine direct connected to a 75-k.w. generator. All energy is generated at 2 ph., 60 cy., 2,200 v. Fuel: run-of-mine coal; yearly consumption, 780 tons at $5. Maximum load, 150 k.w. Continuous service. Ninety-five per cent of the output is used for lighting and 5 per cent for power. Plant installed, 1904; additions made, 1914. **Distribution,** including Florence: 10 mi. of streets, with 30 line transformers having a total capacity of 150 k.w.; primaries at 2,200 v. and secondaries mostly at 220 v., a few houses being supplied at 110 v. Number of consumers, 900, giving a connected load of 225 k.w. for lighting and 25 h.p. in motors. Street lighting, 40-c.p. nitro lamps at $19 per lamp per year. **Rates:** Meter lighting rate, 11 cents per k.w.h., with a monthly minimum charge of $1 and a meter rental. Monthly flat rate, 45 to 60 cents per 60-w. lamp, according to use. Meter power rate, 4 to 10 cents per k.w.h., according to consumption.

Nova Scotia Steel and Coal Company.—The power plant of this company is almost entirely used in connection with the operation of its mines and works, but as a small block of energy is supplied to the Sydney Mines Electric Co., a description of the entire plant follows: **Power Plant:** Capacity of boiler equipment—2,965 h.p., of which 1,125 h.p. is in return tubular and 1,840 h.p. in water-tube boilers. Generating sets: one 2,000-k.w. high pressure and one 750-k.w. mixed pressure turbine units, both operating at 3 ph., 60 cy., 2,200 v.; two 400-k.w. direct connected engine units operating at 250 volts d.c. Fuel: Mainly coke-oven gas; all kinds of local coal for additional requirements. Continuous operation. Plant installed, 1903; additions have been made since.

TRENTON, Pictou Co. (1,749). Supplied from Stellarton system. See Stellarton.

TRURO, Colchester Co. (7,500†). Supplied by two municipal steam-power plants, one for lighting and power and the other for street lighting exclusively. **Steam Plant for Lighting and Power:** Brick power house, 60 x 70 ft. Equipment: four 150-h.p. boilers at 150 lbs. pressure, three being water-tube, and one return tubular. Two compound condensing engines of 125 h.p. and 200 h.p., respectively, and three simple engines of from 60 h.p. to 100 h.p., the total engine capacity being 485 h.p. Nine generators in suitable groups, eight belted and one direct connected, operating at 125 v. and 250 v., d.c.; total capacity, 475 k.w. Maximum load, 300 k.w. with an average yearly load factor of 28 per cent. Of the output, 67 per cent is used for lighting and 33 per cent for power. Fuel: slack coal; yearly consumption, 4,552 tons at $2.90. Continuous service. Plant installed, 1889. Value, $65,000. **Steam Plant for Street Lighting:** Brick power house, 80 x 50 ft., a portion of which is occupied by the water-works. Equipment: one 125-h.p. return tubular boiler and one 175-h.p. water-tube boiler at 115 lbs. pressure, which are also used in connection with the water-works; one 75-h.p. engine direct connected to a 50-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 35 k.w. Fuel: Inverness slack coal at $2.90 per ton; consumption, 550 lbs. per hour. Plant installed, 1913. Value of generating set, $3,200. **Distribution:** 25 mi. of streets and roads at 110 v. to 550 v. d.c. For street lighting, the a.c. system is used; one mile of the street lighting distribution system is underground. Number of consumers, 794; connected motor load, 300 h.p. Value (estimated), $47,000. **Rates:** Meter lighting rate, 10 to 15 cents per k.w.h. Meter power rate, 5½ to 12 cents per k.w.h. Both power and lighting rates vary according to consumption and are subject to a minimum charge and a 10 per cent discount. Street lighting cost, $5,100 per year for 600 nitro lamps of 60 c.p. each.

WATERFORD, Cape Breton Co. Supplied by the Waterford Public Utilities Co., Ltd.; 140,000 k.w.h. at 6,600 v., single phase, 25 cy. is purchased yearly in bulk at 5 cents per k.w.h. from Dominion Coal Co. Maximum demand, 115 k.w. **Sub-station:** Two 75-k.w. station transformers step the voltage down from 6,600 v. to 2,200 v. **Distribution:** Four miles of streets, with primaries at 2,200 v. and secondaries at 110 v., with 15 line transformers, having an aggregate capacity of 100 k.w. and ranging from 2½ k.w. to 15 k.w. Number of consumers, 250, giving a connected load for lighting of 133 k.w. Value of distribution system, $7,000. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting rate, $19.20 per 32-c.p. tungsten lamp per year.

WESTVILLE, Pictou Co. (4,417). Supplied from Stellarton system. See Stellarton.

WINDSOR, Hants Co. (3,452). Supplied by steam plant of Windsor Electric and Power Co., Ltd. **Steam Plant:** Frame power house, 65 x 52 ft. Equipment: two return tubular boilers, operating at 140 lbs. pressure, and one 100-h.p. and one 175-h.p. high-speed horizontal engine, belted to one 45-k.w. and one 90-k.w., 1,150-v., 2-ph., 66-cy. generator. Maximum demand, 105 k.w. Annual output, 135,608 k.w.h. Service averages 10 hours a day. Fuel: culm coal; yearly consumption, 900 tons at $3.50. Plant installed, 1897. Value, $23,900. **Distribution:** 30 mi. of streets, primaries at 1,150 v. and secondaries at

110 v., with 32 line transformers, having a total capacity of 166 k.w. Number of consumers, 328. Value of system, $12,000. **Rates:** Meter lighting rate, 12½ to 22½ cents per k.w.h., according to uses. Flat lighting rate, $8.75 to $12 per light per year. Street lighting rate, $21 per 60-w. tungsten lamp per year.

WOLFVILLE, Kings Co. (1,458). Supplied by steam and oil engine plant of Acadia Electric Light Co. **Power Plant:** Brick power house, 30 x 50 ft. Equipment: one 130-h.p. return tubular boiler at 120 lbs. pressure; one 130-h.p., steam, high-speed engine, and one 50-h.p oil engine, operating at 365 r.p.m., the engines being belted respectively to 75-k.w. and 37-k.w., 3-ph., 60-cy., 2,500-v. generators. Maximum load, 55 k.w. Fuel: bituminous coal and fuel oil; yearly consumption of coal, 389 tons at $6; of fuel oil, 3,000 gals. at 15¼ cents. Service averages 7 hrs. a day. Plant installed, 1891. Value, $13,680. **Distribution:** 5 mi. of streets; primaries at 2,300 v. and secondaries at 110 v., with 9 line transformers, ranging from 4 k.w. to 15 k.w. Value of distribution system, $2,900. Number of consumers, 255, giving a connected load of 65 k.w. **Rates:** Meter rate, 12½ cents per k.w.h. Street lighting, 40-w lamps at 11¼ cents per k.w.h.

YARMOUTH, Yarmouth Co. (7,000†). Supplied by hydro-electric plant of Yarmouth Light and Power Co., situated on West Tusket river at Carleton, some 20 mi. distant. The company has steam and gas auxiliary plants in town. Hebron, Chegoggin and Overton are also supplied from the same system. **Hydro-electric Plant:** A wooden crib dam, 660 ft. long by 35 ft. high, with a wooden penstock 6 x 7 ft. in section and 40 ft. long, leading to a metal-covered frame power house, 30 x 20 ft. Available head, 27 ft. Equipment: one 400-h.p. turbine direct connected to a 300-k.w., 3-ph., 60-cy., 2,200-v. generator. Three 125-k.w. station transformers step the voltage up from 2,200 v. to 22,000 v., 3 ph., 60 cy. Maximum load, 275 k.w. Continuous service. Occasional trouble is experienced from shortage of water in summer, but this will be remedied by a storage project which is being developed. Plant installed 1908. Value, $30,000. A 1,000-h.p. unit will shortly be installed to replace the present one. **Transmission Lines:** A single circuit of three No. 4 copper conductors supported by pin-type insulators on wooden poles, operating at 20,000 v., 3 ph., 60 cy., extends from Carleton to Yarmouth, 20 miles, and can transmit 250 k.w. with a loss of 10 per cent. Low equivalent lightning arresters at each end. Value of line, $30,000. The only substation supplied is at Yarmouth. **Steam Plant and Sub-Station:** Brick building, 40 x 90 ft. Equipment: three boilers of 150, 100 and 50 h.p., respectively, at 110 lbs. pressure; one 125-h.p. compound engine belted to a 150-k.w., 550-volts d.c. generator for street railway and one 150-h.p. compound engine belted to a 125-k.w., 3-ph., 60-cy., 2,200-v. generator. Plant used only as an auxiliary. Fuel: bituminous coal at $8.50 per ton. Plant installed 1892. For the transmitted energy, three station transformers step the voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. Of the output, 40 per cent is used for lighting, 40 per cent for power and 20 per cent for street railway operation. This steam plant will soon be converted into a producer-gas plant. Another steam auxiliary plant of 312 k.w. capacity, using mill refuse for fuel, is being installed. **Gas Auxiliary Plant:** One 80-h.p. gas engine, which can be belted either to a 100-k.w., 550 v. d.c. generator or to a 100-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal gas. Plant serves only as an auxiliary. **Distribution** (including Hebron, Chegoggin and Overton): 40 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v., with 75 line transformers, having a total capacity of 375 k.w. Number of consumers, 560, giving a total connected load of 39 k.w. for lighting, 350 k.w. for power and 50 k.w. for appliances. Value (estimated) of various plants, transmission and distribution systems, $300,000. **Rates:** Meter lighting rate, 15 cents per k.w.h. Meter power rate, 3 to 10 cents per k.w.h., according to load and consumption. All rates are subject to a 10 per cent discount. Street lighting: forty-four 250-c.p. nitro and three hundred and seventeen 60-w. tungsten lamps at a charge of $5,000 per year.

PRINCE EDWARD ISLAND

ALBERTON, Prince Co. (800†). Supplied by Leard Electric Light and Power Co. from a hydro-electric plant on Huntley river, 2¼ mi north of town. **Hydro-electric Plant:** Clay dam, 66 ft. long and 15 ft. high, whence a short flume leads to a power house, 10 x 18 ft. Available head, 14 ft. Equipment: one 39-h.p. turbine, belted to a 30-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Night service only. Installed in 1915. Valued at $1,500. **Distribution:** 5 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, ranging from 1 k.w. to 5 k.w. Number of consumers, 85. Value of system, $2,500. **Rates:** Meter rate, 15 cents per k.w.h. Flat rate, 30 cents per lamp per month. Street lighting, 40-w. lamps at $21 per lamp per year.

CHARLOTTETOWN, Queens Co. (11,203). Supplied by Charlottetown Light and Power Co., from combined steam and gas-engine plant. **Power Plant:** Frame power house, 165 x 160 ft. Steam equipment: two 250-h.p. water-tube boilers at 110 lbs. pressure, one 350-h.p. compound engine belted to a 250-k.v.a. generator. Gas power plant: three gas producers of 1,000 h.p. total capacity; two gas engines, one of 312 h.p. belted to a 250-k.v.a. generator and one of 170 h.p. belted to a 125-k.v.a. generator. Energy is generated at 3 ph., 60 cy., 2,200 v. Gas power plant uses 1,000 tons of pea anthracite yearly, at $13 per ton. Steam plant, only auxiliary, consumes 250 tons yearly of Sydney run-of-mine coal at $8 per ton. Maximum load, 500 k.w., with a yearly load factor of 60 per cent. Cost of power at plant, 2½ cents per k.w.h. Continuous service. Plant installed, 1912. Value, $60,000. **Distribution:** 20 mi. of streets; primaries at 2,200 v., secondaries at 110 v. and 220 v.; 165 line transformers, of 700 k.w. total capacity. Number of consumers, 1,545; connected load, 1,000 k.w. for lighting, 152 h.p. in motors, and 10 k.w. in appliances. Value of distribution system, $70,000. **Rates:** Meter lighting rate, 13 cents per k.w.h. Meter power rate, 7 cents per k.w.h. Meter heating rate, 5 cents per k.w.h. All rates are net. Street lighting rates, $73 for a.c. arc and $23 for 40-w. tungsten lamps, per year.

CRAPAUD, Queens Co. Supplied by Leard & Son, from hydro-electric plant on Crapaud river. **Hydro-electric Plant:** An earth dam, 150 ft. long by 12 ft. high; a wooden flume, 8 ft. x 4 ft. in section and 25 ft. long, leads to a frame power house, 8 ft. x 10 ft. Available head, 11 ft. Equipment: one 40-h.p. turbine, belted to a 25-k.w., 2-ph., 60-cy., 2,200-v. generator. Night service only. Plant installed 1913. Value $1,000. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v., with 6 line transformers, of 20 k.w. total capacity. Number of consumers, 35. Value of distribution system, $1,000. **Rates:** Meter rate, 15 cents per k.w.h.

GEORGETOWN, Kings Co. Supplied from the Montague system. See under Montague.

KENSINGTON, Prince Co. (800†). Supplied by Kensington Electric Co., from a hydro-electric plant on Mill Valley stream, 2¾ mi. distant. **Hydro-electric Plant:** Timber and clay dam, 170 ft. long by 6 ft. high, with a flume, 5 x 6 ft. in section and 40 ft. long; frame power house, 28 x 30 ft. Available head, 12 ft. Equipment: one 30-h.p. turbine, belted to a 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 30 h.p. Night service only. Plant installed, 1916. **Distribution:** 6 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v., with 8 line transformers of 25 k.w total

See page 12 for explanation of abbreviations used in this report.

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† Population statistics with a dagger have been obtained from the municipality.

capacity. Number of consumers, 80, representing a connected load of 60 k.w. for lighting. **Rates:** Meter rate, 15 cents per k.w.h. Street lighting rate, $22.50 per 60-w. tungsten lamp, per year.

MONTAGUE, Kings Co. Supplied by Montague Electric Co., from a hydraulic plant on the Montague river, 1 mi. distant. System also includes Georgetown. **Hydraulic Plant:** Rock dam, 200 ft. long by 25 ft. high, with wooden flume, 14 ft. wide, 6 ft. deep and 56 ft. long, leading to an overshot water wheel, 16½ ft. in diameter, and rated at 80 h.p. under 20-ft. head. The frame power house, 33 ft. x 22 ft., contains a 60-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 62½ k.v.a. The river flow is ample all the year. Cost of generation, $6 per h.p. per year. Night service only. Plant installed, 1899. Value, including distribution system, $30,000. **Distribution:** 12 mi. of streets, primaries at 2,200 v. and secondaries at 104 v.; 30 line transformers of .6 k.w. to 6 k.w. capacity. Number of consumers, 200. **Rates:** Flat rate, $4.50 per 40-w. lamp per year. Meter rate, 10 cents to 15 cents per k.w.h., according to uses. Street lighting rate, $10 and $14 per 25-w. and 40-w. incandescent lamp, respectively, per year.

NORTH TRYON, Prince Co. Supplied by hydro-electric plant of Tryon Roller Mills on Tryon river. Earth dam, 250 ft. long by 13 ft. high. Available head, 12 ft. The power plant, also used as a saw-mill, contains an 18-h.p. turbine, belted to a 30-k.w., single-phase, 133-cy., 1,100-v. generator. Maximum load, 11 k.w. Night service only. A plant had been operated since 1910, but the present one was installed in 1918. Value $2,000. **Distribution:** 5 mi. of streets and roads; primaries at 1,100 v. and secondaries at 110 v.; 10 line transformers of 34 k.w. total capacity. Number of consumers, 20; connected lighting load, 15 k.w. Value of distribution system, $3,000. **Rates:** Meter rate, 15 cents per k.w.h.

SUMMERSIDE, Prince Co. (2,678). Supplied by combined gas and steam-power plant of Sun Electric Co. **Power Plant:** Frame power house, 30 x 60 ft. Equipment: one 200-h.p. return tubular boiler at 100 lbs. pressure; one 125-h.p. steam engine and one 150-h.p. producer gas engine, to which are belted two 150-k.w., 125-cy., 1,040-v. generators. Fuel: 300 tons anthracite for gas plant and 100 tons soft coal at $5.75 for steam plant per year. Maximum load, 100 h.p. Cost of generation, 9 cents per k.w.h. Plant installed, 1906. Value, $40,000. Operates 12 hours daily. **Distribution:** 7 mi. of streets; primaries at 1,040 v. and secondaries at 110 v.; 50 line transformers. Number of consumers, 354; connected load, 200 k.w. Value of distribution system, $10,000. **Rates:** Meter rate, 15 cents per k.w.h. Street lighting rates, $22.50 per 80-w. lamp per year.

NEW BRUNSWICK

ANDOVER, Victoria Co. Supplied under municipal control; obtained in block from Maine and New Brunswick Power Co. at 4 cents per k.w.h. for lighting and 2 cents per k.w.h. for power. (See under Aroostook, N.B.) System includes Perth. **Substation:** Two 50-k.w. station transformers, stepping voltage down from 11,000 v. to 2,200 v., 3 ph., 60 cy. Of the demand of 65 h.p., 70 per cent is used for lighting and 30 per cent for power. **Distribution,** including Perth: 15 mi. of streets and roads, primaries at 2,200 v., and secondaries at 110 v. and 220 v.; 20 line transformers, of 100 k.w. total capacity. Number of consumers, 150; connected load, 75 k.w. for lighting, 20 h.p. in motors and 10 k.w. in appliances. Value of distribution system, $20,000. **Rates:** Meter lighting rate, 10 cents per k.w.h. Meter power rate, 4 cents per k.w.h. Street lighting: 60-w. tungsten lamps at $2.50 per lamp per year.

AROOSTOOK, Victoria Co. The Maine and New Brunswick Power Co. has a hydro-electric plant on the Aroostook river, 2½ mi. above the mouth from which an extensive transmission system is supplied, mainly in the state of Maine, but also including Aroostook, Andover, Perth, Grand Falls and St. Leonard in New Brunswick. **Hydro-Electric Plant:** Concrete dam, 190 ft. long and 50 ft. high, with a diversion canal, in rock, ½ mi. long, 20 ft. deep and 50 ft. average width. It terminates in a concrete bulkhead, whence two iron penstocks, 6 ft. and 9 ft. in diameter, respectively, and 125 ft. long, with two standpipes, one 4 ft. and the other 6 ft. in diameter, lead to a brick power house, 80 x 40 ft. Available head, 75 ft. Equipment: 3 units, one a 2,000-h.p. turbine, direct connected to a 1,500-k.w. generator and two 1,000-h.p. turbines each direct connected to a 500-k.w. generator; all energy is generated at 3 ph., 60 cy., 11,000 v. Maximum demand, 1,800 h.p.; load factor, 80 per cent. Of the energy generated, 40 per cent is used for lighting and power, and 60 per cent for electric railway. Plant installed, 1906. Value, $100,000. **Transmission lines:** Total of 175 mi., of which 10 mi. in New Brunswick. Operate at voltages ranging from 11,000 v. to 33,000 v., 3 ph., 60 cy. A double circuit extends from the plant to Fort Fairfield, Me., the remainder being a single circuit of three No. 2 to No. 4 copper conductors, supported by pin-type insulators on wooden poles. The lines carry a load of 1,800 h.p., with a loss of 9 per cent. Lightning protection: aluminium and multigap arresters. Substations supplied in New Brunswick are: Aroostook, Perth and Andover, and Grand Falls, while St. Leonard is supplied through Van Buren, Me. **Substation:** Aroostook substation equipment: two 25-k.w. transformers, stepping the voltage down from 11,000 v. to 2,200 v. and two 7½-k.w. transformers stepping down from 11,000 v. to 600 v.; all at 3 ph., 60 cy. Energy supplied, 65 h.p., one-half for lighting, the remainder for power. **Distribution:** The local system covers 4 miles of streets and roads; primaries, 2,200 v., secondaries, 110 v.; 6 line transformers, of 25 k.w. total capacity. Number of consumers, 47; connected load, 5 k.w. for lighting, 30 h.p. in motors and 10 k.w. in appliances. Value of system, $5,000. **Rates:** Meter lighting rate, 10 cents per k.w.h., net. Meter power rate, 3 cents to 6 cents per k.w.h., with a monthly minimum of 25 to 50 cents per h.p.

BATHURST, Gloucester Co. (960). Supplied by hydro-electric plant of Bathurst Electric & Power Co. on Tetagouche river, 8½ mi. west of Bathurst. **Hydro-electric Plant:** Concrete dam 97 ft. long and 25 ft. high with an iron penstock 100 ft. long and 5 ft. in diameter, leading to a frame power house, 25 x 25 ft. Available head, 63 ft. Equipment: a 1,000-h.p. turbine, direct connected to a 200-k.v.a., 3-ph., 60-cy., 6,600-v. generator. Maximum load, 80 k.w. Continuous service. A plant had been in operation since 1904, but

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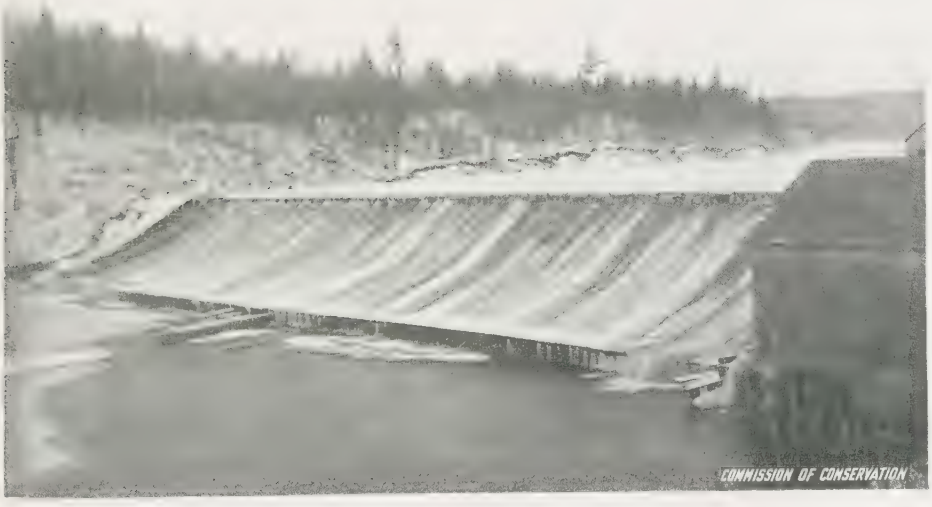
MAINE AND NEW BRUNSWICK POWER CO.—HYDRO-ELECTRIC PLANT NEAR AROOSTOOK, VICTORIA CO., N.B.



WOODSTOCK ELECTRIC CO.—HYDRO-ELECTRIC PLANT AND DAM NEAR WOODSTOCK, N.B

the present one was installed in 1912. Value, including transmission and distribution systems, $135,000. **Transmission line:** The line from the power plant to Bathurst is 8½ mi. long and operates at 6,600 v., 3 ph., 60 cy. It consists of one circuit of three No. 4 copper conductors supported by pin-type insulators on wooden poles. Lightning protection: low equivalent arresters. **Substation:** two 50-k.w. station transformers step the voltage down from 6,600 v. to 2,200 v., 3 ph., 60 cy. **Distribution,** including Bathurst and vicinity: 15 mi. of streets and roads; primaries at 2,200 v; secondaries at 110 v. and 220 v.; 100 line transformers, of 500 k.w. total capacity. Number of consumers, 350; connected load, 400 k.w. for lighting, 110 h.p. in motors and 50 k w. in appliances. **Rates:** Meter lighting rate, 12 cents per k w.h., plus meter rental, with a monthly minimum of 75 cents. Meter power rate, 3 cents per k.w.h. Street lighting: $15 per 100-w. nitro lamp per year.

CAMPBELLTON, Restigouche Co. (4,500†). Supplied by a municipal producer-gas plant. **Power Plant:** Terra-cotta tile power house, 44 x 80 ft. Equipment: three gas producers, two of 175 h.p. and one of 300 h.p. capacity; one 175-h.p. and one 350-h.p. gas engine, belted, respectively, to 100-k.w. and 200-k.w. generators. All energy generated at 3 ph., 60 cy., 2,300 v. Maximum load, 200 k.w., divided into 67 per cent for lighting and 33 per cent for power. Continuous service. Fuel: pea anthracite coal; yearly consumption, 800 tons at $12. Present plant, replacing steam plant in operation since 1898, was installed in 1911. Value, $50,000. **Distribution:** 10 mi. of streets; primaries at 2,300 v., secondaries at 110 v. and 220 v.; 40 line transformers, of 300 k.w. total capacity. Number of consumers, 750; connected load, 550 k.w. for lighting, 225 h.p. in motors and 300 k.w. in appliances. Value of distribution system, $50,000. **Rates:** Meter lighting rate, 10 cents per k.w.h., with discounts up to 10 per cent, according to consumption, plus meter rental. Meter power rate, 10 cents per k.w.h., with discounts up to 50 per cent, according to consumption, with meter rental and monthly minimum of $1.25. Street lighting: $25 per magnetite arc and $7 per 40-w. and 60-w. tungsten lamp per year.

CENTREVILLE, Carleton Co. Supplied by C. M. Sherwood, Ltd., from a hydraulic plant on the Presquile river, ½ mi. distant, operated in connected with a flour mill. **Hydraulic Plant:** Log and timber dam, 175 ft. long by approximately 15 feet high; from which a wooden flume, 9 ft. wide and 50 ft. long, leads to a frame power house, 17 x 24 ft. Available head, 16 ft. Equipment for electric plant: one 160-h.p. turbine, belted through a countershaft to two 30-k.w., d.c. generators at 110 v. Maximum load, 20 k.w. Night service only. Plant installed, 1903. Cost, including distribution system, $8,000. **Distribution:** 4½ mi. of streets and roads; distribution on three-wire system at 110 v. on each side. **Rates:** Domestic flat lighting rate, ½ cent; commercial, 1 cent per 40-w. lamp per night. Street lighting: 1 cent per 40-w. tungsten lamp per night.

CHATHAM, Northumberland Co. (4,666). Supplied by municipal oil-engine power plant. **Power Plant:** Brick power house, 45 x 65 ft., containing two 240-h.p. semi-Diesel oil engines, each direct connected to a 170-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 150 k.w.; oil consumption, ⅓ gallon per k.w.h. Cost of generation, 2·3 cents per k.w.h. Continuous service. Present plant, replacing one in operation since 1886, was installed in 1917. Value, $50,000. **Distribution:** 21 mi. of streets; primaries at 2,300 v. and secondaries at 115 v. to 230 v., with 72 line transformers of 320 k.w. total capacity. Number of consumers, 480; connected load, 200 k.w. for lighting and 112 h.p. in motors. Value of distribution system, $38,000. **Rates:** Meter lighting rate, 15 cents per k.w.h., less 5 per cent discount. Meter power rate, 5½ to 10 cents per k.w.h. Street lighting: 40-c.p. to 80-c.p. tungsten lamps.

CHIPMAN, Queens Co. Supplied by King Lumber Co., Ltd., from a steam plant connected with their mill. **Steam Plant:** Mill equipment: includes a return tubular boiler and a 100-h.p. engine, latter also operating a 25-k.w., 110-v., d.c. generator. Fuel: wood at $2 per cord and coal at $6 per ton. Plant installed, 1910. **Distribution:** ½ mi. of streets,

at 110 v., d.c. Number of consumers, 25; connected load, 22 k.w. for lighting. **Rates:** Flat rate, 45 cents per lamp per month. Meter rate, 10 to 12 cents per k.w.h. Street lighting: 16-c.p. lamps.

DALHOUSIE, Restigouche Co. (1,650). Supplied by municipal producer-gas plant. **Power Plant:** Brick power house, 40 x 49 ft. Equipment: two 75-h.p. gas producers and a 125-h.p. engine belted to a 94-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 20 k.w. Fuel: Pea anthracite, at $11 ton; average daily consumption, 1,100 lbs. Continuous service. Plant installed, 1913. Value, $30,000. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 105 k.w. total capacity. Number of consumers, 123; connected load, 60 k.w. for lighting and 42 h.p. in motors. Value of distribution system, $5,060. **Rates:** Meter rate, 10 cents per k.w.h. Special rates for power. Street lighting, 80-c.p. lamps.

DEVON, York Co. Supplied by Fredericton Gas Light Co. See under Fredericton.

DORCHESTER, Westmorland Co. (1,080). Supplied by steam plant of Dorchester Electric Co. **Steam Plant:** Brick power house 45 x 43 ft., containing one 90-h.p. return tubular boiler at 80 lbs. pressure, and one 75-h.p. engine belted through a countershaft to a 60-k.w., single-phase, 60-cy., 2,300-v. generator. Fuel: Cumberland slack coal; yearly consumption, 675 tons, at $2.60. Maximum load, 33 k.w. Night service only. Plant installed, 1908. Value, $16,000, including distribution system. **Distribution:** 4½ mi. of streets; primaries at 2,300 v. and secondaries at 104 v.; 16 line transformers, of 65 k.w. total capacity. Number of consumers, 100; connected load, 75 k.w. for lighting. **Rates:** Meter rate, 15 cents per k.w.h., with monthly minimum of $1. Street lighting: $15 per 40-w. tungsten lamp per year.

EDMUNDSTON, Madawaska Co. (2,650†). Supplied by municipal hydro-electric plant at the Second fall on Green river, 10 mi. distant. **Hydraulic Plant:** Sluice-type dam, 400 ft. long by 24 ft. high, creating a storage pool, extending two mi. upstream. Equipment: two 275-h.p. water wheels, operating under a 20-foot head, belted to two 115-k.w., 3-ph., 60-cy., 2,300-v. generators. Three 75-k.w. transformers step up the voltage from 2,300 v. to 15,000 v. Continuous service. Maximum load, 305 k.w., of which 35 per cent is used for lighting and 65 per cent for power. Plant installed 1911. Value, $85,000. **Transmission line:** 10⅜ mi. of single circuit, three No. 4, hard-drawn copper conductors, on cedar poles, protected at both ends by multi-gap lightning arresters. Transmission voltage, 15,000 v., 3 ph. Value, $9,000. **Substation:** Three 75-k.w. station transformers stepping down voltage from 15,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** 5 mi. of streets; primaries at 2,200 v.; 22 line transformers of 3 k.w. to 5 k.w. capacity. Number of consumers supplied, 250; connected load, 145 k.w. for lighting and 180 h.p. in motors. Value of distribution system, $16,900. **Rates:** Meter rate, lighting, from 10 to 12 cents per k.w.h., less discounts of from 20 to 35 per cent; power, from 3 to 6 cents per k.w.h., less discount of 10 per cent; in both cases the rate is governed by the consumption. Street lighting: 75-w. tungsten lamps at $15 per lamp per year.

FAIRVILLE, St. John Co. (576†). Supplied by New Brunswick Power Co. See under St. John.

FREDERICTON, York Co. (7,208). Supplied by steam-power plant of Fredericton Gas Light Co., except street lighting, which is supplied from a municipal steam plant.

Fredericton Gas Light Company—Steam Plant: Brick power house approximately 68 x 90 ft. Equipment: three Robb-Mumford boilers, 120, 150 and 200 h.p., respectively, at 120 lbs. pressure; one 468-k.v.a. steam turbine unit and one 266-h.p. cross-compound engine, direct connected to a 175-k.w. generator; all energy at 2-ph. 60-cy., 2,300-v. Fuel: Nova Scotia run-of-mine and Inverness coal; yearly consumption, 3,500 tons, at $6.60. Maximum load, 350 k.w.; total output, 586,688 k.w.h., of which 88 per cent is used for lighting and 12

per cent for power. Value of plant, $45,000. Cost of generation, 3½ cents per k.w.h. Plant installed, 1903. Continuous service. **Distribution:** Including Devon, 25 mi. of streets; primaries at 2,300 v. and secondaries at 115 v. and 230 v.; 96 line transformers, of from 5 k.w. to 20 k.w. capacity. Number of consumers, 952; connected load, for power alone, 300 h.p. Approximate value, $67,000. **Rates:** Meter lighting rate, 20 cents per k.w.h., less discounts of 40 per cent for domestic use and from 20 to 40 per cent for commercial use. Power rate, 10 cents per k.w.h., less discounts from 19 to 50 per cent.

Municipal Street Lighting System—Steam Plant: Brick power house, 50 x 70 ft. Equipment: two 100-h.p. return tubular boilers at 95 lbs. pressure and one 95-h.p. engine belted through a countershaft to two 120-lamp (65 k.w.) d.c. arc generators. Maximum load, 50 k.w. Fuel: Sydney bituminous screened coal; yearly consumption, 500 tons, at $8. Plant installed, 1887; operated for street lighting only. **Distribution:** 13 mi. of streets; enclosed arc lamps, nitro and tungsten lamps from 60 c.p. to 400 c.p. Cost of operation, including interest, $10,000 yearly. Value of plant and outside system, $30,000.

GRAND FALLS, Victoria Co. (1,280). Energy supplied under municipal control; obtained in block from the Maine and New Brunswick Power Co. (see under Aroostook) at 4 cents per k.w.h. for lighting and 2 cents per k.w.h. for power; **Substation:** two 75-k.w. station transformers step the voltage down from 11,000 v. to 2,200 v., 3 ph., 60 cy. Of the demand of 130 h.p. 23 per cent is used for lighting and 77 per cent for power. **Distribution:** 8 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 12 line transformers, of 50 k.w. total capacity. Number of consumers, 125; connected load, 75 k.w. for lighting, 150 h.p. in motors and 15 k.w. in appliances. Street lighting: 60-c.p. nitro lamps. Value of distribution system, $10,000. **Rates:** Meter lighting rate, 10 cents per k.w.h., less 10 per cent discount. Meter power rate 3 to 10 cents per k.w.h.

KOUCHIBOUGUAC, Kent Co. (380†). Supplied from Richibucto-Rexton system. See under Richibucto.

MARYSVILLE, York Co. (1,837). Supplied by Canadian Cottons, Ltd., from a steam plant connected with their mill. **Power Plant:** Five return-tubular boilers of 1,350 h.p. total capacity, at 125 lbs. pressure, supply steam mainly for the mill. Plant supplying village: brick building, 20 x 24 ft., containing one 100-h.p. vertical engine, direct connected to a 62-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 10 k.w. Fuel: Minto Mine screenings, at $2.60 per ton. Value of electric plant, $6,000. Cost of power, 8 cents per k.w.h. Plant installed, 1916. Night service only. **Distribution:** 4 mi. of streets; primaries at 2,250 v. and secondaries at 110 v.; 6 line transformers, of 22½ k.w. total capacity. Number of consumers, 130; giving a connected load of 65 k.w. for lighting. No energy is supplied for power. Value of distribution system, $10,000. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting: $16.20 per 100-w. nitro lamp per year.

MILLTOWN, Charlotte Co. (1,800). Supplied by St. Stephen Electric Light Co. See under St. Stephen.

MONCTON, Westmorland Co. (15,384†). Supplied by Moncton Tramways, Electricity and Gas Co., from steam plant, which also supplies energy for street railway purposes. **Steam Plant:** Two brick buildings 50 x 76 ft. and 75 x 76 ft., respectively; containing three 200-h.p. and one 150-h.p. return tubular boilers, operating at 125 to 150 lbs. pressure; two 450-h.p. engines direct connected to two 300-k.w., 2-ph., 60-cy., 1,100-v. generators, and one 300-h.p. compound engine, belted to a 250-k.w., 550-v., d.c. generator. Equipment also includes one 150-k.w. motor-generator for street railway purposes. Fuel: run-of-mine coal; monthly consumption, 600 tons, at $5.25 per ton at the mine. Maximum load, 880 k.w.; yearly output, 1·8 million k.w.h., of which 75 per cent is used for lighting and 25 per cent for power, including street railway. Value of plant, $50,000. Cost of generation, 2¾ cents

per k.w.h. Continuous service. Plant installed, 1904; numerous additions have been made. **Distribution,** including various suburbs: approximately 50 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 180 line transformers of from 4 k.w. to 50 k.w. capacity. Number of consumers, 1,543 for lighting and 42 for power. Value of distribution system, $100,000. **Rates:** Meter rates, 4 to 11 cents per k.w.h., less 5 per cent discount. Street lighting: $15 for each 60-c.p. nitro and $65 for each series arc lamp, per year.

NEWCASTLE, Northumberland Co. (2,945). Supplied by municipal steam plant. **Steam Plant:** Stone power house, 50 x 80 ft., containing one 175-h.p. water-tube and two 125-h.p. return tubular boilers; one 100-h.p. compound engine belted to a 75-k.w. generator, and one 250-h.p. simple engine direct connected to a 150-k.w. generator, the generators being 2 ph., 60 cy., 2,200 v. Maximum load, 150 k.w. Fuel: slack coal in winter, and sawdust and wood refuse in summer; yearly coal consumption, 1,200 tons at $3; yearly cost of wood fuel, $1,000. Total yearly output, 110,000 k.w.h. Night service only. Cost of generation, $60 per h.p. per year; cost of generation and distribution, approximately, 10 cents per k.w.h. **Distribution:** 12 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 55 line transformers of from 5 to 15 k.w. capacity; primary voltage, 2,200 v.; house lighting, 110 v. Number of consumers, 375. **Rates:** Meter rate, 12 cents per k.w.h. Street lighting: 80-w. and 32-c.p. lamps.

PERTH, Victoria Co. Supplied under municipal control, in conjunction with Andover. See under latter.

PORT ELGIN, Westmorland Co. Supplied by S. C. Hayward, from a steam plant connected with mill. **Steam Plant:** One 100-h.p. return tubular boiler, also used for mill operation, and one 50-h.p. engine belted to a 56-k.w., 220-v., d.c. generator. Fuel: mill refuse. Plant installed, 1907. Value, including distribution system, $4,500. **Distribution:** 5 mi. of streets, at 220 v., d.c. Number of consumers, 55. **Rates:** Meter rate, 15 cents per k.w.h. with a monthly minimum of $1.00, plus meter rental. Street lighting: $16 per 16-c.p. lamp per year.

REXTON, Kent Co. Supplied from the Richibucto-Rexton system. See under Richibucto.

RICHIBUCTO, Kent Co. (871). Supplied, under municipal control, in conjunction with Rexton, from a hydro-electric plant on the Kouchibouguac river at Kouchibouguac; the latter village and St. Louis also supplied. **Hydro-electric plant:** Concrete dam, 210 ft. long by 28 ft. high, with adjacent frame power house on concrete foundations, 40 x 30 ft. Head, 21 ft., which can be increased to 35 ft. Equipment: one 270-h.p. turbine, belted to a 250-k.w., 3-ph., 60-cy., 2,200-v. generator, with three 50-k.v.a. outdoor type transformers stepping up voltage from 2,200 v. to 11,000 v., 3 ph., 60 cy. Maximum load, 150 h.p. Continuous service. Plant installed, 1917. Value, $40,000. **Transmission Line:** Operates at 11,000 v., 3 ph., 60 cy. One circuit of three No. 6 copper conductors, supported by pin-type insulators on wooden poles, from Kouchibouguac to Richibucto, 12 mi. Estimated value of line, $7,200. Substation at Richibucto, from which Rexton is also supplied, and at St. Louis. Kouchibouguac is supplied directly from the power plant. **Substations:** Richibucto substation is of the out-door type, and comprises three 50-k.w. transformers, stepping down from 11,000 v. to 2,200 v., 3 ph., 60 cy. At St. Louis, there is also an outdoor transformer of 10 k.w. capacity, stepping down from 11,000 v. to 110 v. **Distribution,** including Richibucto, Rexton, St. Louis and Kouchibouguac: 16 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 40 line transformers, of 200 k.w. total capacity. Number of consumers, 100; connected load, 75 k.w. for lighting and 100 h.p. in motors. Value of distribution system, $7,800. **Rates:** Meter lighting rate, 12 cents per k.w.h., with a meter rental. Flat power rate, $30 per h.p.-year. Meter power rate, 3 cents per k.w.h. Street lighting: $12 per 100-w. tungsten lamp per year.

ROTHESAY, Kings Co. Supplied by the New Brunswick Power Co. See under St. John.

SACKVILLE, Westmorland Co. (2,300). Supplied by Eastern Electric and Development Co., Ltd., from a steam plant. Middle Sackville is also supplied, and is included in this description. **Steam Plant:** Brick power house, 50 x 80 ft. Equipment: one 225-h.p. and one 110-h.p. return tubular boiler; one 225-h.p. Corliss and two 100-h.p. high-speed engines, one of the latter being tandem compound; belt-driven generators, one 150 k.w., one 75 k.w. and one 50 k.w., all 3 ph., 60 cy., 2,300 v. Fuel: bituminous coal; yearly consumption, 1,750 tons, at $5.80. Practically continuous service. Maximum demand, 250 h.p., with a load factor of 7 per cent; the low load factor is due to high demand of short duration from colleges. Plant installed, 1891; rebuilt, 1908. Value, $27,000. **Distribution:** 10 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v. and 220 v., mostly the latter; 28 line transformers. Value of distribution system, $20,000. **Rates:** Meter lighting rate, 15 cents per k.w.h. Meter power rate, 3 to 10 cents per k.w.h. Street lighting: $18.75 per 40-w. tungsten lamp per year.

SHEDIAC, Westmorland Co. (1,442). Supplied by Shediac Electric Light and Power Co. from hydro-electric plant on the Shediac river, 2 mi. distant. **Hydraulic Plant:** Stone and wooden crib dam, 275 ft. long and 25 ft. high ; a concrete flume leads to a wooden power house, 40 x 20 ft. Equipment : one 108-h.p. turbine, operating under a head of 25 ft., is belted to a 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum demand, 50 k.w. Occasional interruptions occur during the winter, due to lack of water. Night service only. Plant installed, 1910. Cost of plant and development, $31,000. **Distribution:** 4 mi. of streets and roads, supplied direct from power house; primaries at 2,300 v. and secondaries at 110 v.; 10 line transformers, of from 2 to 7 k.w. capacity. Number of consumers, 90. **Rates:** Meter lighting rate, 15 cents per k.w.h., less 10 per cent discount for ordinary consumption, and increased discount for large consumption. Street lighting: $12.75 per 60-w. tungsten lamp per year.

ST. JOHN, St. John Co. (42,511). Supplied by steam plant of New Brunswick Power Co. **Power Plant:** Brick power house, 95 x 150 ft. Equipment: ten water-tube boilers, seven of 250 h.p. and three of 500 h.p. under 140 lbs. pressure; five generating units, two of which are turbo units of 2,000-k.w. and 500-k.w. capacity, respectively; one 1,000-h.p. and one 900-h.p. compound condensing engine, direct connected, respectively, to 650-k.w. and 600-k.w. generators. The energy of these four units is generated at 3 ph., 60 cy., 2,300 v. The fifth unit is a 1,100-h.p. condensing engine, direct connected to a 750-k.w., 550-v., d.c. generator for electric railway service. There is also a 750-k.w. motor generator set to supply the latter service. Maximum load on station, 3,000 k.w., 45 per cent of which is used for electric railway and 55 per cent for lighting and power. Fuel: bituminous run-of-mine coal; yearly consumption, 15,375 tons. Plant was remodelled in 1895, but had been in operation previously. **Distribution,** including Fairville, Rothesay and other villages, 75 mi. of streets and roads; primaries at 2,300 v. and secondaries at 107 v.; 530 line transformers, of 4,600 k.w. total capacity. Number of consumers, 7,092; connected capacity, 4,000 k.w. for lighting and 1,350 h.p. in motors. **Rates :** Meter lighting rate, 6 to 12 cents per k.w.h., according to consumption, with a monthly minimum charge of $1.00. Meter power rate, 2 to 10 cents per k.w.h., according to consumption, with a monthly minimum of $1 per h.p. Both above rates are subject to 10 per cent discount. Street lighting: $75 per enclosed arc lamp per year.

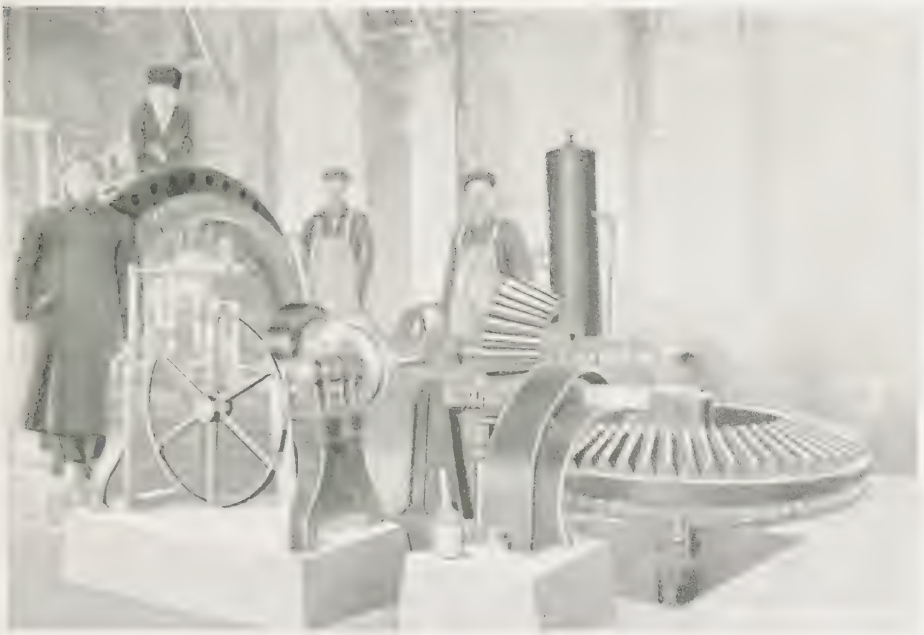
ST. LEONARD, Madawaska Co. St. Leonard Electric Co., Ltd., distributes electric energy obtained from Maine and New Brunswick Electric Power Co., Ltd. (see under Aroostook) through Van Buren Light and Power Co. **Distribution:** Four 5-k.w. line transformers; primary voltage, 2,200 v.; house lighting, 110 volts. Number of consumers, 50; connected load, 15 k.w. for lighting and 15 k.w. in appliances and motors. The yearly output for lighting purposes is 13,000 k.w.h., and for power, 700 k.w.h. **Rates:** Meter rate for both lighting and power, 10 cents per k.w.h , with 20 per cent discount on large consumption.

ST. LOUIS, Kent Co. (219†). Supplied from the Richibucto-Rexton system. See under Richibucto.

ST. STEPHEN, Charlotte Co. (3,273†). Supplied by the St. Stephen Electric Light Co. from hydro-electric plant on St. Croix river, at Milltown. This company also supplies Milltown, N.B., and Calais, Maine. A 360-h.p. auxiliary steam plant is situated in the latter place. **Hydro-electric Plant:** Timber dam, 3,000 ft. long by 7 ft. high, with 3 wooden conduits, 6 x 8 ft. rectangular section and 150 feet long, leading to a frame power house, 100 x 60 ft. Equipment: 4 turbines operate under a head of 12 ft., three are of 250 h.p. each and the fourth is 125 h.p. The three larger turbines are belted through a countershaft to a 300-k.w. and a 200-k.w., 3-ph., 60-cy., 2,300-v. generator; the small wheel is belted through another countershaft to a 130-lamp, 70-k.w., d.c., arc generator. Maximum load, 225 k.w. Continuous service. Of output, 80 per cent is used for lighting and 20 per cent for power. Plant installed, 1887; renewed since. Estimated value, $50,000. **Distribution:** in St. Stephen and Milltown: 10 mi. of streets, primaries at 2,300 v. and secondaries at 110 v. to 220 v., 35 line transformers, of 175 k.w. total capacity. Number of consumers, 330; connected load, 150 k.w. for lighting, 100 h.p. in motors and 25 k.w. in appliances. Value of distribution systems, $25,000. **Rates:** Meter lighting rate, 7 to 10 cents per k.w.h., according to consumption, with minimum monthly charge of $1. Meter power rate, 1 to 6 cents per k.w.h., according to consumption, plus monthly fixed charge of $1 per h.p. Street lighting: magnetite and 40-w. tungsten lamps at $60 and $22 per lamp per year.

SUSSEX, Kings Co. (2,000). Supplied by steam plant of Sussex Manufacturing Co. **Steam Plant:** Brick power house, 28 x 44 ft. Equipment: three return tubular boilers, of 290 h.p. total capacity, with pressures from 75 to 115 lbs.; one 75 h.p. compound engine, belted to a 40-k.w. generator, and a 125-h.p. engine belted to a 60-k.w. generator, the energy being generated at 2 ph., 133 cy., 2,000 v. Maximum load, 90 k.w. Night service only. Fuel: 1,000 tons of coal yearly, at $5.50 per ton. Value of plant, including distribution system, $26,000. **Distribution:** 10 mi. of streets; primaries at 2,000 v. and secondaries at 110 v.; 42 line transformers, of from ¼ k.w. to 7½ k.w. capacity. Number of consumers, 325; connected load, 702 k.w., for lighting only. **Rates:** Meter rate, 14 to 15½ cents per k.w.h., less 10 per cent discount. Street lighting: $18.25 per 80-c.p. lamp per year.

WOODSTOCK, Carleton Co. (3,856). Supplied by Woodstock Electric Co., from a hydro-electric plant on the Meduxnekeag river 2 mi. above its mouth. An auxiliary steam plant is also available. **Hydro-electric Plant:** Wooden dam, 300 ft. long and 30 ft. high; adjacent, frame power house 30 x 40 ft. Head utilized, 30 ft. Equipment: two 250-h.p. turbines, each belted to a 200-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 500 h.p., divided, 60 per cent for power and 40 per cent for lighting. Shortage of water is sometimes experienced. Plant installed, 1904. Continuous service. **Steam Plant:** Brick building, 30 x 40 ft., adjoining the hydro-electric plant. Equipment: one 200-h.p. return tubular boiler and one 300-h.p. compound condensing engine, which can be belted to one of the hydro-electric generators. Fuel: bituminous coal. The plant, which is seldom used, was installed in 1915. Value of hydro-electric and steam plants, $150,000. **Distribution,** in luding Upper Woodstock, Lower Woodstock and Grafton: 20 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 200 line transformers, of 500 k.w. total capacity. Number of consumers, 600; connected load, 300 k.w. for lighting, 300 h.p. in motors, and 150 k.w. in heating appliances. Value of distribution system, $60,000. **Rates:** Meter lighting rate, 10 cents per k.w.h. Meter power rate, 2 to 3 cents per k.w.h., according to consumption. Street lighting: 135 nitro lamps of 100 w. at total yearly charge of $1,800.



HYDRO-ELECTRIC PLANT OF LA CIE. ÉLECTRIQUE D'AMQUI, AMQUI, MATANE CO., QUE.
Supplies four villages in Matane County, Quebec.

HYDRO-ELECTRIC PLANTS AT SHAWINIGAN FALLS, ST. MAURICE RIVER, ST. MAURICE CO. QUE. TOTAL CAPACITY, 185,000 H.P.

QUEBEC

ACTONVALE, Bagot Co. (1,402). Supplied by P. Guertin, from a hydro-electric plant on the Black river, 2½ miles south of town. **Hydro-electric Plant:** Stone-filled crib dam, 180 ft. long by 8 ft. high with frame power house 80 x 30 ft., giving 8-ft. head. Equipment: two turbines, of 40 and 20 h.p., respectively, belted through a countershaft to a 40-k.w., single-ph., 60-cy., 2,200-v. generator. Maximum load, 50 h.p. Night service only. Slight trouble from low water in summer. Plant installed, 1901; value, $12,000, including distribution system. **Distribution:** 5½ mi. of streets; primaries at 2,200 v. and secondaries at 104 v.; 10 line transformers of 32 k.w. total capacity. Number of consumers, 126; connected load, 42 k.w. for lighting and 8 k.w. in appliances. **Rates:** Meter rate, 10 cents per k.w.h., with meter rental; flat rate, from 25 to 50 cents per 60-w. lamp per month. Street lighting: 60-w. lamps, at $9 per lamp per year.

ALMAVILLE, Champlain Co. (845†). Supplied by St. Maurice Light and Power Co. See under local distribution, Shawinigan Falls.

AMQUI, Matane Co. (1,216*). Supplied by La Compagnie Electrique d'Amqui from a water-power plant in the village situated on the Matapedia river. Villages of Lac-au-Saumon, Val-Brillant and Sayabec also supplied. **Hydraulic Plant:** Concrete dam, 18 ft. high by 86 ft. long, with a 6-ft. penstock 96 ft. long to brick power house 28 x 34 ft., giving 22-ft. head. Equipment: one 379-h.p. vertical turbine geared to a 250-k.w., 3-ph., 60-cy., 2,200-v. generator; also five 125-k.w. station transformers, raising the voltage from 2,200 v. to 10,000 v. Maximum load, 70 k.w. Continuous service. Plant in operation since 1913; value, $52,321. **Transmission Lines:** Energy is transmitted at 10,000 v., over a total of 30 mi. of lines. Six 25-k.w. station transformers at the different substations step the voltage down from 10,000 v. to 2,200 v. Value of transmission lines, $23,386. **Distribution:** Primaries at 2,200 v. and secondaries at 110 v.; 32 line transformers of from 1 k.w. to 10 k.w. capacity. Number of consumers, 500. Value of the four systems of distribution, $15,455. **Rates:** Meter rate, 15 cents per k.w.h., less 15 per cent discount; flat rate, for lighting, 1 cent per day per 16 c.p.; for power, $25 and upwards per h.p. per annum. Street lighting in Amqui: series nitrogen lamps.

ARTHABASKA, Arthabaska Co. (1,458). Supplied by the Arthabaska Water and Power Co. See under Victoriaville.

ASBESTOS, Richmond Co. (2,224). Supplied by the Manville Asbestos Co., 2,000 k.w. being obtained from the Continental Heat and Light Co., which is supplied from Shawinigan Falls. A very small portion of this is used for lighting purposes, mostly to supply the company's employees. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers of 30 k.w. total capacity. Number of consumers, 25; connected load, 10 k.w. for lighting and 3 k.w. in appliances. Distribution system valued at $2,000. **Rates:** Monthly flat rate, $1.00 per family. Street lighting: 32-c.p. lamps.

AYERS CLIFF, Stanstead Co. (316). Supplied by Southern Canada Power Co. (See under Sherbrooke). **Substation:** One-half mile distant, also supplies Way Mills, Massawippi and East Hatley. Equipment: three 50-k.v.a. station transformers stepping voltage down from 22,000 v. to 2,200 v., 3 ph. Output divided, 71 per cent for lighting and 29 per cent for

See page 12, for explanation of abbreviations used in this report.

NOTE—Except where otherwise stated, the statistics of population have been extracted from the Census of 1911.

* Population statistics with an asterisk have been obtained from the Provincial Statistics.

† Population statistics with a dagger have been obtained from the municipality.

power. **Distribution:** The four systems supplied from this substation include a total of 17 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 47 line transformers of 1½ k.w. to 20 k.w. capacity. Number of consumers, 151; connected load, 65 k.w. for lighting and 175 h.p. in motors. **Rates:** For lighting, 10 cents per k.w.h., less 25 per cent discount, with a minimum charge; power flat rate, $70 to $130 per k.w. per annum; power meter rate, 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of $2 to $8 per k.w., with a discount up to 70 per cent, according to restrictions in use, and additional discounts for special conditions and 10 per cent for prompt payment. Street lighting: 40-w. and 60-w. tungsten lamps, at $5 and $8, respectively, and $4 for 16-c.p. lamps per year.

AYLMER, Ottawa Co. (3,109). Supplied by Hull Electric Co. See under Hull.

BAGOTVILLE, Chicoutimi Co. (1,011). Supplied by La Société d'Eclairage du Saguenay. See under Grande-Baie.

BAIE-DE-SHAWINIGAN, St. Maurice Co. (1,024). Supplied by St. Maurice Light and Power Co. See under local distribution for Shawinigan Falls.

BAIE-D'URFE, Jacques-Cartier Co. (287*). Supplied from Pointe-Claire system, and included in description of latter. Amount taken, 12 h.p. Value of this portion of system, $4,500. **Rates:** Same as Pointe Claire.

BAIE-ST. PAUL, Charlevoix Co. (1,857). Supplied by Cie. Electrique Baie St. Paul, from a hydraulic plant situated on the Bras Nord-ouest, a tributary of the Gouffre river, near the village. **Hydraulic Plant:** Wooden dam 37 ft. high by 85 ft. long, with a 40-in. steel penstock 2,200 ft. long, leading to a frame power house 29 x 31 ft., giving 110 ft. head. Equipment: one 290-h.p. turbine, direct connected to a 300-k.w., 2-ph., 60-cy. 2,200-v. generator; maximum load, 200 h.p. Night service only. Slight trouble from ice and low water. Plant installed in 1898, and valued at $40,000. **Distribution:** 3¾ mi. of streets; primaries at 2,000 v. and secondaries at 104 v.; 13 line transformers of 2½ k.w. to 15 k.w. capacity. Number of consumers supplied, 350 for lighting. Distribution system valued at $8,000. **Rates:** Yearly flat rate, from $2.50 to $5 per 40-w. lamp. Street lighting: 40-w. tungsten lamps.

BEACONSFIELD, Jacques-Cartier Co. (1,050*). Supplied from Pointe-Claire system and included with latter. Amount taken, 59 h.p., at $40 per h.p.-year. Value of this portion of the system $15,000. **Rates:** Same as Pointe-Claire.

BEAUCEVILLE, Beauce Co. (1,677). Supplied by the Beauce Electric Co. (See under St. Joseph, Beauce.) **Substation:** Two 25-k.w., single-phase station transformers, stepping voltage down from 15,000 v. to 2,200 v. **Distribution :** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 10 line transformers of 100 k.w. total capacity. Number of consumers, 206; connected load, 63 k.w. for lighting and 40 h.p. in motors. **Rates:** Yearly flat rate for lighting, from $4.20 to $6.00 per 16-c.p. and 15 cents per watt for high efficiency lamps; meter rate, 11¼ cents per k.w.h. net, plus meter rental, with a yearly minimum of $1 per lamp. Meter rate for power, from 1 to 2 cents per k.w.h., plus a monthly fixed charge of $1.50 per h.p.; flat rate for power, $30 per h.p. per year. Street lighting: 40-w. tungsten lamps, at $5 per lamp per year, without maintenance.

BEAUHARNOIS, Beauharnois Co. (2,105). Supplied by Canadian Light and Power Co. (see under Montreal); distributed by the Beauharnois Electric Co. **Substation:** The substation, which also supplies Bellevue, Maple Grove, Woodlands and Châteauguay, contains three 300-k.w. station transformers, stepping the voltage down from 44,000 v. to 2,200 v., while three 50-k.w. units step up from 2,200 v. to 6,600 v. for distant distribution. Total load, 800 h.p., divided 20 per cent for lighting and 80 per cent for power, the latter being

practically confined to one consumer. The yearly load factor is 52.3 per cent. **Distribution:** Including all places supplied, 20 mi. of streets, primaries in Beauharnois, 2,200 v., and outside, 6,600 v., secondaries 110 v. to 550 v.; 53 line transformers, of from 2½ k.w. to 15 k.w., and of 310 k.w. total capacity. Number of consumers, 600; total connected load, for both lighting and power, 1,800 h.p. **Rates:** Meter lighting rate in Beauharnois, 9 cents per k.w.h.; in Châteauguay, 10 cents per k.w.h., and for summer contracts, 12 cents per k.w.h.; flat power rate, from $30 to $50 per h.p.-year. Street lighting in Beauharnois: 100-c.p. tungsten and nitro lamps, at a cost for energy of $35 per h.p.-year; in Châteauguay and vicinity 80-c.p. lamps are supplied by the company at $25 per lamp per year.

BEAUPORT, Quebec Co. Supplied by the Quebec Railway, Light, Heat and Power Co., the system being included under Quebec. (See under Quebec.) The following special power system supplies energy used in the quarries. **Substation:** Two 300-k.w. transformers, stepping voltage down from 24,000 v., 3 ph., to 2,200 v., 2 ph., 63 cy. **Distribution:** 1 mi. of roads; primaries at 2,200 v. and secondaries at 550 v.; two transformers each of 200 k.w. capacity. Number of consumers, 3; connected load, 400 k.w. **Rates:** The rates are the same as for Quebec.

BEDFORD, Missisquoi Co. (1,432). Supplied by Bedford Light Co. from a water-power plant on Pike river. **Hydraulic Plant:** Timber dam, 132 ft. long, from which an 8-ft. wooden flume leads to a frame power house 30 x 100 ft.; 13-ft. head afforded. Equipment: one 100-h.p. turbine, direct connected to a 50-k.w., single-ph., 133-cy., 1,100-v. generator. Maximum load, 43 k.w. Plant installed in 1912, and valued at $18,500, including the system of distribution. **Distribution:** 2½ mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 22 line transformers of 55 k.w. total capacity. Number of consumers, 90; connected load, 140 k.w. **Rates:** Monthly flat rate, 50 cents per lamp; meter rate, 15 cents per k.w.h. Street lighting: 25-w. lamps, at $8 per lamp per year.

BEEBE, Stanstead Co. (808). Supplied by Southern Canada Power Co. (See under Sherbrooke). **Substation:** Two 100-k.w. and one 250-k.w. station transformers, stepping the voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. Output divided, 8 per cent for lighting and 92 per cent for power. **Distribution:** Including Park Lake, 8 mi. of streets; primaries at 2,200 v., secondaries at 110 v. to 550 v.; 25 line transformers, of 325 k.w. total capacity. Number of consumers, 144; connected load, 22 k.w. for lighting and 200 h.p. in motors. **Rates:** For lighting, 10 cents per k.w.h., less 25 per cent discount, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per annum, according to amount; meter rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w., the power rates being all subject to discounts up to 70 per cent, according to restrictions in use, with additional discounts for special conditions and 10 per cent for prompt payment. Street lighting: 60-w. tungsten and 16-c.p. lamps, at $15 and $5, respectively, per year.

BELŒIL, Verchères Co. (1,501). Supplied under municipal control, a block of 40 h.p. being obtained from the Montreal Light, Heat and Power Consolidated plant through the Southern Canada Power Co. at $30 per h.p.-year. **Distribution:** 6 mi. of streets; primaries at 2,200 v., secondaries at 110 v. to 550 v.; 24 line transformers, of 3 k.w. to 20 k.w. capacity. Number of consumers, 198; connected load, 85 k.w. for lighting and 12 k.w. in motors. **Rates:** Meter lighting rate, 12 cents per k.w.h.; power rate, 6 cents per k.w.h. Street lighting: 100-c.p. tungsten lamps, at $10.30 per lamp per year.

BERTHIERVILLE, Berthier Co. (1,335). Supplied by St. Maurice Light and Power Co., a block of 300 h.p. being obtained from the Shawinigan Water and Power Co. **Substation:** Three station transformers, two of 75 k.w. and one of 60 k.w., stepping the voltage down from 12,500 v. to 2,200 v., at 3 ph., 30 cy. **Distribution:** 2 mi. of streets; primaries at 2,200 v.; 15 line transformers, of 120 k.w. total capacity. Number of consumers, 225; con-

nected load, 75 k.w. for lighting, 300 h.p. in motors and 10 k.w. in appliances. **Rates:** Meter lighting rate, from 4 to 12 cents per k.w.h., according to consumption, with a minimum monthly charge; flat lighting rate, 60 cents per 100-w. lamp per month; power rate, 3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. Street lighting: 100-w. and 150-w. lamps, at $14 per 100-w. lamp per year.

BIC, Rimouski Co. (876†). Supplied by a private corporation, the Crédit Municipal Canadien. See under Rimouski.

BLACK LAKE, Megantic Co. (2,645). Distributed by Thetford Mines Electric Company. See under Thetford Mines. Also supplied by the Continental Heat and Light Co.

Continental Heat and Light Company—This company only distributes electric energy to large power consumers, purchasing it in bulk from the Shawinigan Water and Power Co. at one cent per k.w.h. **Substation:** Six 300-k.w. station transformers, stepping the voltage down from 44,000 v. to 2,400 v., 30 cy. Power supplied, approximately 1,500 k.w. for power, and a small amount for lighting. **Distribution:** 10 mi. of streets; number of consumers, 6; connected load in motors, 2,000 k.w. **Rates:** Flat rate, $30 per h.p. per year.

BOUCHERVILLE, Chambly Co. (1,097). Supplied by Sorel Light and Power Co. The description of the entire system is included under Sorel.

BROMPTONVILLE, Richmond Co. (1,239). Supplied by Southern Canada Power Co. (See under Sherbrooke). **Substation:** Two 100-k.w. transformers, stepping the voltage down from 48,000 v. to 2,400 v., practically all the output at present being for lighting. **Distribution:** 5 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 15 line transformers, of 73 k.w. total capacity. Number of consumers, 161; connected load, 25 k.w. for lighting. **Rates:** Meter lighting rate, 10 cents per k.w.h., less 25 per cent discount and with a monthly minimum; flat power rate, from $70 to $130 per k.w. per annum, according to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w.; power rates subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting: 25-w. tungsten lamps, at $8 per lamp per year.

BROWNSBURG, Argenteuil Co. Supplied by Ayers, Limited. See under Lachute.

BUCKINGHAM, Labelle Co. (3,854). Supplied from a hydro-electric plant on the Lièvre river in the central portion of the town, owned by Albert MacLaren; the system also includes Masson village. **Hydro-electric Plant:** Crib dams, 20 ft. high with a 5-ft. iron penstock 400 ft. long, leading to a frame power house, 46 x 36 ft. Equipment: one 550-h.p. turbine, operating under a 50-ft. head, and direct connected to a 300-k.w., 2-ph., 60-cy., 2,300-v. generator. The plant, installed in 1913, and valued at $30,000, is operated 12 hours daily, and has a maximum demand of 200 k.w.; cost of generation $10 per h.p. **Distribution:** 12 mi. of streets; primaries at 2,300 v., 2 ph., secondaries at 110 v.; 82 line transformers, of from 1½ k.w. to 7½ k.w. capacity. Number of consumers, 750; connected load, 225 k.w.; value of distribution system, $15,000. **Rates:** Flat rate per 40-w. lamp, $3 per year for residences, $4 for commercial lighting, and from $2 to $2.50 for large installations. Street lighting: both series arcs and 400-c.p. series tungsten lamps, at $55 per lamp per annum.

BURY, Compton Co. Supplied by Westbury Electric Light and Power Co. See under East Angus.

CACOUNA, Temiscouata Co. (517). Supplied under municipal control. See under Rivière-du-Loup.

CAMPBELLS BAY, Pontiac Co. (447). Supplied by J. Wilson, from a hydro-electric plant on Stevenson creek, in the village. **Hydro-electric Plant:** Concrete dam 80 ft. long by 8 ft. high, with a 30-inch steel penstock 400 ft. long, leading to a concrete and frame power house, 18 x 24 ft.; head available, 95 ft. Equipment: one 90-h.p. turbine, direct connected to a 60-k.w., 3-ph., 60-cy., 2,300-v. generator; maximum load, 15 k.w.; night service only. The plant, installed in 1914, is valued at $12,000, including the distribution system. **Distribution:** 3½ mi. of streets; primaries at 2,300 v.; five line transformers of 26 k.w. total capacity. Number of consumers, 37. **Rates:** Meter rate, 15 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $12 per lamp per year.

CAPELTON, Sherbrooke Co. Supplied by Southern Canada Power Co. through Sherbrooke transmission system. (See under Sherbrooke). **Substation:** Equipment includes three 200-k.w. station transformers, stepping the voltage down from 22,000 v. to 2,200 v.; load carried, 200 h.p., 24 per cent for lighting and 76 per cent for power, the latter mostly for mining purposes. **Distribution:** ½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 3 line transformers of from ½ k.w. to 10 k.w., and of 35 k.w. total capacity. Number of consumers, 17; connected load, 14 k.w. for lighting and 200 h.p. in motors. System valued at $1,500. **Rates:** lighting rate 10 cents per k.w.h., less 25 per cent discount, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per annum, according to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w.; power rates are all subject to discounts up to 70 per cent, according to restrictions in use, with additional discounts for special conditions and 10 per cent for prompt payment.

CAP-MAGDELEINE, Champlain Co. (See under Three Rivers).

CAP-ROUGE, Quebec Co. (490†). Supplied by Quebec Railway, Light, Heat and Power Co. (See under Quebec).

CARILLON, Argenteuil Co. (188). Supplied by the North River Electric Company, Ltd. See under St. Andrews.

CASCADES, Ottawa Co. Supplied by F. T. Cross. (See under Farm Point).

CHAMBLY, Chambly Co. (900). Supplied by Willetts, Ltd. ; the system also includes Chambly Canton. Energy is obtained in block from the Chambly plant of the Montreal Light, Heat and Power Consolidated. (See under Montreal). **Distribution :** The two systems include 11 mi. of streets; primaries at 2,200 v. and secondaries from 110 v. to 550 v.; 33 line transformers, of from 2 k.w. to 15 k.w. Number of consumers, 305; connected load, 176 k.w., practically all for lighting. Total value of systems, $17,170. **Rates:** Meter rate, 7 cents per k.wh., with a minimum charge and meter rental; yearly flat rate, from $3.20 to $5.50 per 16 c.p., according to number. Street lighting: 32-c.p. lamps, at $13 per lamp per year.

CHAMBLY CANTON, Chambly Co. (857). Supplied by Willetts, Ltd. (See under Chambly).

CHAMPLAIN, Champlain Co. (740†). Supplied by North Shore Power Co. (See under St. Narcisse).

CHANDLER, Gaspe Co. (1,151*). Supplied by St. Lawrence Pulp and Lumber Corporation, from a steam-power plant in connection with the mill. **Power Plant:** Reinforced concrete building 190 x 72 ft., containing six 500-h.p. water-tube boilers at 175 lbs. pressure and two 1,000-k.w. turbo-generators, electric energy being at 3 ph., 60 cy., 600 v.; also two 150-k.w. and one 75-k.w. station transformers, stepping the voltage up from 600 v. to 2,200 v. Maximum demand, 1,400 k.w.; load factor, 65 per cent; 91 per cent of the load is used in

the operation of the mill and 9 per cent for lighting. Fuel: bituminous coal, approximately 175 tons per day, at $11.00. Value of power plant, $132,000; cost of generation, between 8 and 10 cents per k.w.h. The plant, installed in 1913, gives continuous service. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and 600 v. and secondaries at 110 v. and 220 v.; 12 line transformers, of 140 k.w. total capacity. Number of consumers, 180; connected load, 75 k.w. for lighting and 1,780 h.p. in motors, the latter being used to operate the mill. Distribution system valued at $8,000. **Rates:** Meter rate, 12 cents per k.w.h. Street lighting: 100-w. lamps.

CHARETTE, St. Maurice Co. (400†). Supplied by La Cie. d'Eclairage de Yamachiche. (See under Yamachiche.)

CHARLEMAGNE, L'Assomption Co. (776). Supplied by Laval Electric Co. (See under Ste. Thérèse).

CHICOUTIMI, Chicoutimi Co. (5,880). Supplied by La Société d'Eclairage et d'Energie Electrique du Saguenay from a hydro-electric plant situated on the Chicoutimi river three miles distant, Bagotville, Rivière-du-Moulin and Ste. Anne being also supplied. **Hydraulic Plant:** Concrete dam 20 ft. high by 450 ft. long, from which three steel penstocks 10 ft. in diameter and 350 ft. long lead to a concrete power house 105 x 60 ft.; head, 53 ft. Equipment: three 2,500-h.p. turbines, each direct connected to a 1,875-k.v.a., 3-ph., 60-cy., 2,200-v. generator, and two 175-h.p. exciter units operated by independent turbines. The station transformers include nine 600-k.v.a. units, stepping the voltage up from 2,200 v. to 11,800 v. The maximum demand is 1,500 k.w., and it is anticipated that this will be increased to 5,000 k.w. in the future. A storage reservoir of 4,110 million cubic feet provides against shortage of water. The plant, installed in 1912 and valued at $500,000, gives continuous service. **Transmission Line:** Energy is transmitted four miles to Chicoutimi at 12,500 v., 3 ph., 60 cy. The line is a single circuit of three No. 0000 conductors, supported by pin-type insulators on wooden poles and is designed to transmit 5,625 k.v.a. with a loss of 2 per cent; lightning protection consists of aluminium arresters. The transmission line is valued at $16,000. **Substation:** Two 937-k.v.a. station transformers, stepping the voltage down from 11,800 v. to 2,200 v. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 45 line transformers of from 5 k.w. to 50 k.w. capacity. Number of consumers, 1,500, of which 11 for power. Distribution system valued at $15,000. **Rates:** Flat rate for domestic lighting, from $2 to $6; for commercial lighting, from $3 to $7 per 16-c.p. lamp per year; a discount of 10 per cent is allowed for domestic lighting The flat rate for power is from $20 to $40 per h.p per year. Street lighting: 100-w. nitrogen lamps at $8 per lamp per year.

COATICOOK, Stanstead Co. (3,165). Supplied under municipal control, from two water-power plants on the Coaticook river, within the town. **No. 1 Hydraulic Plant:** Concrete dam 100 ft. long by 30 ft. high, from which a 6-ft. penstock 60 ft. long leads to a concrete power house 34 x 22 ft.; head, 40 feet. Equipment: one 330-h.p. horizontal turbine, direct connected to a 250-k.w., 3-ph., 60-cy., 2,200-v. generator. The plant was installed in 1910. **No. 2 Hydraulic Plant :** Wooden dam 16 ft. high by 100 ft. long, from which a 6-ft. wooden penstock, 315 ft. long, leads to a brick power house 60 x 34 ft.; head, 30 feet. Equipment: one 320-h.p. horizontal turbine direct connected to a 250-k.w., 3-ph., 60-cy., 2,200-v. generator. First installed in 1897; power house and machinery renewed in 1913. The two plants, which are operated in conjunction, give continuous service, the maximum demand being 450 k.w.; they are valued at $48,000, and the cost of generation is $15 per h.p. per year. **Distribution:** 15 mi. of streets; primaries at 2,200 v. and secondaries at 550 v. and 220 v. for power and 110 v for lighting; 65 line transformers, of from 1 k.w. to 50 k.w. capacity. Number of consumers, 475; connected load, 375 k.w. for lighting and 350 k.w. in motors. Value of distribution, $30,000. **Rates:** Meter lighting rate, 6 cents per k.w.h.; for cooking, 2 cents per k.w.h.; flat power rate, from $15 to $25 per h.p. per year. Street lighting: 60-c.p. series nitrogen lamps, at $15 per lamp per year.

COLERAINE, Megantic Co. (517†). Supplied by St. Francis Water Power Co. See under Disraeli.

COMO and HUDSON, Vaudreuil Co. (combined population, 1,500†). Supplied by Montreal Light, Heat and Power Consolidated. (See under Montreal). **Distribution:** 3½ mi. of streets; secondaries at 110 v. Number of consumers, 82. **Rates:** Meter rate, from 12·5 cents to 15 cents per k.w.h., less a discount of 10 per cent. Street lighting: 150-c.p. lamps, at $18.50 per lamp per year.

COMPTON, Compton Co. (382) Supplied by Southern Canada Power Co. See under Waterville.

CONTRECŒUR, Verchères Co. (624). Supplied by Sorel Light and Power Co. See under Sorel.

COOKSHIRE, Compton Co. (996). Supplied by Westbury Electric Light and Power Co. See under East Angus.

COWANSVILLE, Missisquoi Co. (881). Supplied by Southern Canada Power Co. from a local hydro-electric plant on the Yamaska river. Later, electric energy will be obtained from the Sherbrooke transmission line. (See under Granby). The present system also includes Sweetsburg. **Substation:** Two 100-k.w station transformers, stepping the voltage down from 48,000 v. to 2,200 v., 3 ph., 60 cy. **Hydro-electric Plant:** Stone masonry dam 40 ft. long by 20 ft. high with a 30-inch steel pipe ¼ mile long, leading to a frame power house 25 x 25 ft ; available head, 25 ft. Equipment: one 65-h.p. turbine, belted to a 62½-k.w., 3-ph., 60-cy., 2,200-v. generator; maximum load, 30 k.w. The plant, installed in 1905, gives a continuous service. **Distribution:** including Sweetsburg, 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 75 k.w. total capacity. Number of consumers, 150; connected load, 30 k.w. for lighting, 5 h.p. in motors, and 25 k.w. in appliances. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 25 per cent discount with a monthly minimum, and, for appliances, 3 cents per k.w.h. Flat power rate, from $70 to $130 per k.w. per annum, according to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. The power rates are subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting: 100-w. tungsten lamps, at $12 per lamp per year.

DANVILLE, Richmond Co. (1,331). Supplied by Shipton Electric Light and Power Co., from a combined water-power and steam-power plant on Nutting brook, within the village. **Power Plant:** The hydraulic development includes a wooden and concrete dam 90 ft. long by 20 ft. high, with a flume 5½ ft. in diameter and 125 ft. long, leading to a power house 30 x 58 ft.; available head, 18 ft. Equipment: one 210-h.p. turbine, belted to a 90-k.w., single-ph., 60-cy., 2,200-v. generator. The steam plant, which is only used as an auxiliary during low water, consists of two 100-h.p. return tubular boilers at 125 lbs. pressure and one 150-h.p. engine, belted to the same generator as the turbine. Fuel: bituminous and 'bird's eye' coal; yearly consumption, about 300 tons, at $8.65. Maximum demand, 25 k.w. The plant, valued at $16,000, gives only a night service. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 30 line transformers, of from ¾ k.w. to 5 k.w. capacity. Number of consumers, 200; connected load, 70 k.w., all for lighting. Distribution system valued at $3,000. **Rates:** The meter rate is 10 cents per k.w.h. Street lighting : 60-w. tungsten lamps, at $10 per lamp per year.

DESCHAMBAULT, Portneuf Co. Supplied by La Cie. Hydraulique de Portneuf, from a hydro-electric plant on the Ste. Anne river near St. Alban. The company also supplies St. Alban and St. Marc. **Hydro-electric Plant:** Reinforced concrete dam 135 ft. long

by 65 ft. high, with an excavated head race from 33 ft. to 60 ft. wide and 40 ft. long, whence three 6-ft. steel penstocks, 40 ft. long, lead to a concrete and frame power house 38 ft. square, where a normal head of 48 ft. is available. Equipment: one vertical unit, with a 550-h.p. turbine, direct connected to a 500-k.v.a., 3-ph., 60-cy., 6,600-v. generator. The complete installation is to include three of these units. The plant, which gives a continuous service, was installed in 1916 and its present value is $97,000. **Transmission Lines:** Energy is transmitted to the villages supplied at 6,600 v., 3 ph., 60 cy., this voltage being also really the primary voltage of distribution, except at St. Marc, where it is stepped down by means of two 175-k.v.a. station transformers to 2,200 v. **Distribution:** 14 mi. of streets, including the supply line to the villages supplied; primaries at both 6,600 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 19 line transformers, of 325 k.v.a. total capacity; connected load, 100 k.w. for lighting and 255 h.p. in motors. The transmission and distribution systems are valued at a total of $26,000. **Rates:** Meter rate for lighting, 8 cents per k.w.h.; flat rate for power, from $25 to $40 per h.p.-year, according to amount used. Street lighting: 60-w. nitro lamps, at $8 per lamp per year.

DISRAELI, Wolfe Co. (1,606). Supplied almost entirely by the Champoux Co., from a hydro-electric plant on the St. Francis river in the village. The St. Francis Water-Power Co. also has an important hydro-electric plant on the same river 2½ miles above the village.

Champoux Company—Hydro-electric Plant: The development, which formerly was used in connection with a saw-mill, includes a timber dam 5 ft. high by 250 ft. long, whence a 5-ft. wood-stave pipe, 75 ft. long, leads to a frame power house 20 x 30 ft.; available head, 20 ft. Equipment: one 80-h.p. turbine, belted to a 75-k.w., single-ph., 60-cy., 2,400-v. generator; maximum load, 32 k.w. The plant, which gives a night service only, was installed in 1897, and is valued at $5,000, exclusive of water-power rights, but including the distribution system. **Distribution:** 4 mi. of streets; primaries at 2,400 v. and secondaries at 110 v.; 7 line transformers of 50 k.w. total capacity. Number of consumers, 150; connected load, 45 k.w. for lighting only. **Rates:** Flat lighting rate, from $2 to $5 per 40-w. lamp yearly, according to number. Street lighting: 40-w. tungsten lamps, at $2.50 per lamp per year.

St. Francis Water-Power Company—This plant is on the St. Francis river, 2½ miles above Disraeli. The company operates an extensive system of transmission lines along the Quebec Central railway, extending from Weedon in the south and including from Ste. Marie to St. George, Beauce. **Power Plant:** Combined hydro-electric and steam-power plant. Hydraulic development: stone-filled crib dam 40 ft. high by 700 ft. long, whence an open wooden flume 20 ft. wide by 18 ft. high and 268 ft. long, terminating in three iron penstocks, each 10 ft. in diameter, leads to a brick power house 150 x 72 ft.; available head, 44 ft. Equipment: three units, two of 1,200-h.p. turbines, each direct connected to a 750-k.w. generator, and one 1,600-h.p. turbine, direct connected to a 1,050-k.w. generator; energy generated at 3 ph., 60 cy., 2,200 v.; two 1,000-k.w. and two 250-k.w. station transformers, stepping the voltage up from 2,200 v. to 15,000 v., 3 ph., 60 cy. Steam equipment: four 300-h.p. return tubular boilers, at 180 lbs. pressure, and one 1,750-h.p. Corliss compound condensing engine, connected by a rope drive to the 1,050-k.w. hydraulic unit, permitting operation either by water or steam-power. Maximum load, 2,500 k.w.; yearly load factor, 60 per cent; continuous service. The steam plant, which is used as an auxiliary only, uses run-of-mine bituminous coal, but it has not been operated during the last three years. Slight trouble was formerly experienced from shortage of water, but this has been remedied by the conservation dam constructed by the Quebec Government to control lake St. Francis. The hydraulic plant was installed in 1903 and the steam plant in 1910. **Transmission Lines:** The two lines from this plant extend in opposite directions, one following the Quebec Central railway to Robertson and continuing thence as the property of the Beauce Electric Co. to the Beauce district, while the other line, which also follows the Quebec Central railway, extends to Weedon. The company's own lines have a total length of 37 miles, operating at 15,000 v., 3 ph., 60 cy., the estimated losses being 10 per cent. The line from Disraeli to Black Lake has a double circuit, while the others are single circuit, each circuit consisting of

three No. 4 copper conductors supported by pin-type insulators on wooden poles. Lightning protection, low-equivalent arresters. **Substations:** The following substations are supplied: Weedon and Fontainebleau: See under Weedon for local distribution. St. Gerard: One 10-k.w. transformer, to step down the voltage from 15,000 v. to 110 v. Garthby: One 50-k.w., single-ph. transformer, stepping the voltage down from 15,000 v. to 2,200 v. Disraeli: One 50-k.w., single-ph. transformer, stepping voltage down from 15,000 v. to 2,200 v. Coleraine: One 15-k.w. transformer, stepping the voltage down from 15,000 v. to 110 v. Thetford Mines: Four 250-k.w. station transformers, stepping the voltage down from 15,000 v. to 2,200 v. and supplying a demand of 1,500 h.p. for power purposes. Robertson: Three 250-k.w. station transformers, stepping the voltage down from 15,000 v. to 2,200 v. to supply a local demand of 700 h.p. for power. A block of 200 h.p. is also sold from this station at 15,000 v. to the Beauce Electric Co. for further transmission and distribution, and also some 30 h.p. for local lighting distribution. **Distribution:** The distribution systems in the above mentioned places are not extensive and the data, excluding Weedon, may be grouped, as follows: 7 mi. of streets; primaries usually at 2,200 v. and secondaries for lighting at 110 v.; 14 line transformers, of 140-k.w. total capacity. Number of consumers, 200; connected load, 80 k.w. for lighting and 3,000 h.p. in motors. **Rates:** Meter lighting rate, 11 cents per k.w.h.; meter power rate, from ·7 to ·9 cent per h.p.-hour, plus a fixed charge varying with amount. Street lighting: 40-w. tungsten lamps, at $6 per lamp per year.

DIXVILLE, Stanstead Co. (404). Supplied by J. B. Parker, from a water-power plant on the Coaticook river in the village. The development is also used to operate a saw mill. **Hydraulic Plant:** Concrete dam 190 ft. long by 16 ft high, with two penstocks, one of which is 4 x 6 ft., and the other, which is used for the electric plant, 4 x 4 ft. Equipment: one 40-h.p. turbine, belted to a 30-k.w., 110-v., d.c. generator; maximum load, 8 k.w. The plant was installed in 1916. **Distribution:** 1½ mi. of streets; distribution at 110 v., d.c. Number of consumers, 22. **Rates:** Yearly flat rate, $1 to $2 per lamp. Street lighting: 40-w. lamps at $5 per lamp per year.

DORVAL, Jacques-Cartier Co. (1,005). Supplied under municipal control, 136 h.p., at $35 per h.p.-year, being obtained in block from the Montreal Light, Heat and Power Consolidated, at 2,200 v. (See under Montreal). **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 24 line transformers, of from 3 k.w. to 10 k.w. capacity. Number of consumers, 175; connected load, 75 k.w. for lighting and 100 h.p. for municipal uses. **Rates:** Meter lighting rate, 10 cents net per k.w.h. Street lighting: 80-c.p. nitro lamps every 100 ft.

DRUMMONDVILLE, Drummond Co. (1,725). Supplied by Southern Canada Power Co. from a hydro-electric plant in the town on the St. Francis river. **Hydraulic Plant:** Wooden dam 800 ft. long by 6 ft. high, one end forming a flume 200 ft. long, from which two 6-ft. penstocks 8 ft. in length lead to a brick power house 40 x 20 ft.; available head, 9½ ft. Equipment: one 250-h.p. and one 175-h.p. vertical water wheel, geared, respectively, to a 150-k.w. and a 120-k.w., 3-ph., 60-cy., 2,300-v. generator. A smaller flume also supplies a water-works pump installed in the power house. Maximum load, 200 k.w., with a daily output of 3,000 k.w.h. The plant, which gives continuous service, was installed in 1908, and is valued at $75,000. **New Plant:** Construction on a new hydro-electric plant, on the St. Francis river at Drummondville, will shortly begin. This will include a concrete dam 1,650 ft. long and from 11 ft. to 17 ft. high, with an adjacent concrete and brick power house 96 x 91 ft., and available head of 30 ft. The initial equipment will include two vertical units of 3,000-h.p. turbines, each direct connected to a 3,150-k.v.a., 3-ph., 60-cy., 2,300-v. generator. The estimated cost of the plant is $700,000. Provision is also made for the future installation of two additional units of 5,500 h.p. capacity each. **Distribution:** 3 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 10 line transformers, of from 5 k.w. to 40 k.w. capacity. Value of system, $10,000. Number of consumers, 517; connected

load, 70 k.w. in lighting, 50 k.w. in appliances, and 200 k.w. in motors. **Rates:** Meter rate for lighting, 7·5 cents per k.w.h.; for heating appliances, 3 cents per k.w.h. Flat power rate, from $70 to $130 per k.w. per annum, according to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. The power rates are subject to discounts up to 70 per cent, according to restrictions in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting; 100-w. tungsten lamps, at $12 per lamp per year. Note: Two extensions of this system are being constructed to St. Cyrille and St. Germain, each 5½ mi. long, with primaries at 2,300 v. and a total line transformer capacity of 50 k.w.

EAST ANGUS, Compton Co. (2,599†). Supplied by Westbury Electric Light and Power Co., from a water-power plant on the Eaton river, 1½ miles south of the village. Cookshire, 5 miles distant, and Bury, 10 miles distant, also supplied. **Hydraulic Plant:** Wood-and-concrete dam 250 ft. long by 13 ft. high, from which two 4-ft. flumes, 12 ft. and 24 ft. long, respectively, lead to a concrete-and-frame power house 30 x 32 ft., affording a head of 25 ft. Equipment: two 150-h.p. turbines, one of which is belted to a 100-k.w. and the other to a 75-k.w., 3-ph., 60-cy., 3,000-v. generator. Maximum demand, 250 h.p.; cost of generation, $12 per h.p. per year. Difficulty is sometimes experienced from anchor and broken ice. The plant, which gives continuous service, was installed in 1906 and is valued at $60,000. **Transmission Lines and Distribution:** 17 mi. of streets; primaries at 3,000 v. and secondaries at 110 v.; 28 line transformers, of from ·6 to 5 k.w. capacity. Energy is transmitted at the generator voltage of 3,000 v. to the three centres, each line being a single circuit of three conductors supported on wooden poles. Number of consumers, 700; connected load, 250 k.w.; value, $12,000. **Rates:** Meter rate, for lighting, from 8 to 10 cents per k.w.h.; for power, from 2 cents upward. Street lighting: 60-w. tungsten lamps, at 50 cents per lamp per month.

EAST BROUGHTON, Beauce Co. (1,000†). Supplied by a private company, a block of 30 h.p. being obtained from the Continental Heat and Light Co. at a yearly rate of $1,000. The latter company also distributes. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 3 line transformers, of 17 k.w. total capacity. Number of consumers, 50; connected load, 13 k.w. for lighting only. **Rates:** Monthly flat rate for lighting, 45 cents per 16-c.p. lamp.

Continental Heat and Light Co.—Distributes power to large power consumers only, purchasing it in block from the Shawinigan Water and Power Co. at one cent per k.w.h. **Substation:** Equipment: three 300-k.w. station transformers, stepping the voltage down from 44,000 v. to 2,400 v., 3 ph., 30 cy. Approximately 1,000 k.w. is supplied for power, with a small amount for lighting. The system covers approximately 3 mi. of streets, and has 3 consumers, the connected load in motors being 2,000 k.w. **Rates:** Flat rate of $30 per h.p. per year.

EAST HATLEY, Stanstead Co. (242*). Supplied by Southern Canada Power Co. See under Ayers Cliff.

EUSTIS, Sherbrooke Co. Supplied partly by the Eustis Mining Co. from its own hydro-electric plant and partly from the Sherbrooke transmission system of the Southern Canada Power Co.; the latter company also distributes for lighting purposes. **Hydro-electric Plant:** Situated on the Coaticook river, 2½ miles distant; capacity, 300 k.w., energy being generated at 2,200 v. **Substation:** The equipment to receive the energy from the Southern Canada Power Co. comprises three 200-k.v.a. station transformers, stepping the voltage down from 22,000 v. to 2,200 v., at 3 ph., 60 cy.; the total load carried is 500 k.w., 5 per cent being for lighting and 95 per cent for power. **Distribution:** Combined systems, 1½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 16 line transformers, of 143 k.w. total capacity; a large portion of the motor load is supplied directly at 2,200 v. Number of lighting consumers, 53. **Rates:** Lighting rate, 10 cents per k.w.h., less 25 per cent discount, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per annum, according

to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w.; power rates are all subject to discounts up to 70 per cent, according to restrictions in use, with additional discounts for special conditions and 10 per cent for prompt payment.

FARM POINT, Ottawa Co. Supplied by F. T. Cross, from a hydro-electric plant on Meach creek, near the village. North Wakefield, Wakefield and Cascades also supplied. **Hydro-electric Plant:** Concrete dam 150 ft. long, with a 30-in. steel conduit 500 ft. long leading to a concrete power house 16 x 24 ft., giving a head of 75 ft. Equipment: one 200-h.p turbine, direct connected to a 150-k.w., 3-ph., 60-cy., 4,400-v. generator; maximum demand, 200 h.p., a large portion of which is used for a portable saw-mill. The plant, which gives a service 19 hours per day, was installed in 1912, and is valued at $30,000, including the distribution. **Distribution:** 16 mi. of roads; primaries at 4,400 v. and secondaries at 110 v.; 15 line transformers, of from 1 k.w. to 50 k.w. Number of consumers, 100; the power load alone is 75 h.p. **Rates:** Flat rate, 30 cents per lamp per month. Street lighting: 50-w. lamps, at $15 per lamp per year.

FARNHAM, Missisquoi Co. (3,560). Supplied, under municipal control, from a combined hydro-electric and steam-power plant on the Yamaska river, in the town. **Power Plant:** The hydraulic development includes a reinforced concrete dam 260 ft. long by 17 ft. high, with a concrete flume 12 x 12 ft. in section and 1,300 ft. long, leading to a brick power house 33 x 70 ft.; available head, 31 ft. Equipment: two 600-h.p. turbines, each direct connected to a 300-k.w., 3-ph., 60-cy., 2,300-v. generator. The steam equipment, in the same building, consists of two 150-h.p. boilers, at 130 lbs. pressure, and one 540-h.p. compound condensing engine, direct connected to one of the hydro-electric units through a clutch. This auxiliary steam plant is very seldom operated. Maximum load, 200 k.w., approximately 70 per cent for lighting and 30 per cent for power. Shortage of water is sometimes experienced, but, during the past three years, there has been sufficient to operate the plant. The power plant, installed in 1911, is valued at $160,000, and gives continuous service. **Distribution:** 12 mi. of streets; primaries at 2,300 v. and secondaries at from 110 v. to 550 v.; 30 line transformers, of 450 k.w. total capacity. Number of consumers, 600; connected load, 300 k.w. in lighting and 100 h.p. in motors. The distribution system is valued at $40,000. **Rates:** Meter rate for lighting, 10 cents per k.w.h.; for heating appliances, from 3 to 5 cents per k.w.h., according to consumption; flat rate for power, $20 per h.p.-year, while the meter rate is 5 cents per k.w.h. Street lighting: 80-c.p. and 250-c.p. nitro lamps, at $10 per 80 c.p. per year.

FOSTER, Brome Co. (220†). Supplied by Southern Canada Power Co. from a local hydro-electric plant at Foster, on the Yamaska river, at the outlet of Brome lake. **Hydro-electric Plant:** The development includes two dams. One, a stone-filled crib dam, for storage purposes, is situated ¼ mile above the power dam, and is 80 ft. long by 12 ft. high; the power dam is of concrete construction, and is 60 ft. long by 20 ft. high, including flash boards of 3 ft.; a wooden flume 80 ft. long, 18 ft. wide and 15 ft. deep leads to a stone power house 35 x 50 ft.; available head, 24 ft. Equipment: one 300-h.p. turbine, belted to a 150-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 120 k.w. Low water is sometimes experienced intermittently between July and September. The plant was installed in 1900, and gives a continuous service. Later, will be supplied from the Sherbrooke transmission line. (See under Granby) **Substation:** Two 100-k.w. station transformers, stepping the voltage down from 48,000 v. to 2,200 v., 3 ph., 60 cy. This station also supplies Waterloo and Knowlton. **Distribution:** Including Waterloo and Knowlton, 12 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 50 line transformers, of 400 k.w. total capacity. Number of consumers, 370; connected load, 175 k.w. for lighting. The system of distribution is valued at $20,000. **Rates:** Lighting rate, 10 cents per k.w.h., less a discount of 25 per cent, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per year, according to amount, while the meter rate is from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. The power rates are subject to discounts up to 70 per cent,

according to restrictions in use, with additional discounts for special conditions and 10 per cent for prompt payment. Street lighting: 100-w. tungsten lamps, at $9 per lamp per year.

FRELIGHSBURG, Missisquoi Co. (282). Supplied by the Frelighsburg Feed and Light Co., from a combined water-power and steam plant on the Pike river in the village. **Power Plant:** Stone and concrete dam 84 ft. long by 14 ft. high, with an iron conduit 30 in. in diameter and 190 ft. long, leading to a mill in which the electric equipment is installed; available head, 21 ft. The turbine, which is also used to operate the mill, is rated at 92 h.p., and is geared and belted through a countershaft to a 25-k.w., 115-v., d.c. generator. Maximum load, 14 k.w. Hydraulic plant installed in 1899, improved since. Steam plant: one 60-h.p. boiler and a 40-h.p. Corliss engine, installed in 1914, and only used as an auxiliary. Power plant valued at $3,000. **Distribution:** ¾ mi. of streets; distribution at 115 v., d.c. Number of consumers, 33. Distribution system valued at $3,000. **Rates:** Yearly flat rate, from $3 to $6 per lamp, according to number. Street lighting: 40-w. tungsten lamps, at $7 per lamp per year.

GARTHBY, Wolfe Co. Electric energy is supplied by the St. Francis Water Power Co. See under Disraeli.

GASPE, Gaspe Co. (606). Supplied by K. J. Carter, Reg'd, from a gasolene-engine plant. **Power Plant:** The equipment comprises a 5-h.p. gasolene engine, belted to a 3-k.w., 110-v., d.c. generator. Power plant valued at $1,800. **Distribution:** 1½ mi. of streets; distribution at 110 v., d.c.; number of consumers, 14; connected load, 3 k.w., all for lighting. Distritribution system valued at $1,000. **Rates:** Meter rate, 31 cents per k.w.h. (3·5 cents per amp.-hr.) Street lighting: 25-w. to 100-w. tungsten lamps, charged on meter basis.

GIFFARD, Quebec Co. Supplied by Quebec Railway, Light, Heat and Power Co. See under Quebec.

GRANBY, Shefford Co. (6,000*). Supplied by Southern Canada Power Co., which is now completing a long distance transmission line from Sherbrooke to supply Granby and surrounding district, including Foster, Knowlton, Waterloo, Cowansville and Sweetsburg. **Transmission Line:** The line runs from Sherbrooke, passing through Magog, Foster, West Shefford and Adamsville, with branch lines extending to the other municipalities. It has a total length of 60 miles, and will operate at 48,000 v., 3 ph., 60 cy. It consists of one circuit of three ⅛-in. galvanized steel stranded wires, supported by pin-type insulators on wooden poles, and supplies substations at West Shefford, Adamsville, Eastman, Magog and Rock Forest. Granby is at present supplied from a combined steam and hydro-electric plant on the Yamaska river. **Power Plant:** The hydraulic development includes a crib-work dam 75 ft. long by 13 ft. high, with a steel flume 5 ft. in diameter and 150 ft. long leading to a brick power house 75 x 30 ft.; available head, 14 ft. Equipment: one 100-h.p. turbine, belted through a countershaft to a 187-k.w., 2,200-v., 3-ph., 60-cy. generator. Steam equipment: two 150-h.p. water-tube boilers at 100 pounds pressure; one 75-h.p. and one 200-h.p. condensing engine belted to the same countershaft as the hydraulic turbine. The steam plant is operated practically every night carrying the peak load. Fuel: run-of-mine bituminous coal; average daily consumption, 2½ tons, at $13. Maximum load on the entire plant, 120 k.w.; continuous service; plant installed in 1899. Shortage of water is sometimes experienced. **Substation:** When the new transmission line is in operation the system will be supplied from a substation with three 500-k.v.a. station transformers, stepping the voltage down from 48,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at from 110 v. to 550 v.; 15 line transformers, of 110 k.w. total capacity. Number of consumers, 600; connected load, 200 k.w. for lighting, 6 h.p. in motors and 5 k.w. in heating appliances. **Rates:** Meter rate, for lighting, 10 cents per k.w.h. less 25 per cent discount, with a monthly minimum, and for appliances, 3 cents per k.w.h.; flat rate for power, from $70 to $130 per k.w. per year, according to amount, while the meter rate is from

0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. Power rates are subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting: 500-w. tungsten lamps.

GRANDE-BAIE, Chicoutimi Co. (1,355). Supplied by La Société d'Eclairage du Saguenay, from a hydro-electric plant on the Ha-ha river, ¾ mile above the village, which also supplies Bagotville and Port Alfred. **Hydro-electric Plant:** Concrete dam 200 ft. long by 14 ft. high, with a 5-ft. flume, partly wood-stave and partly steel, 1,600 ft. long, leading to a concrete and frame power house 40 x 50 ft.; available head, 75 ft. Equipment: one 450-h.p. turbine belted to a 200-k.w. and a 100-k.w. generator, and one 500-h.p. turbine direct connected to a 375-k.w. generator, all the energy being generated at 3 ph., 60 cy., 2,200 v. The maximum load is 200 k.w., 33 per cent being for lighting and 67 per cent for power. The plant, giving a continuous service, was installed in 1917 and is valued at $75,000. The plant will also partly supply company's local pulp mill. **Distribution:** Including Bagotville and Port Alfred, 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 30 line transformers, of 250 k.w. total capacity. Number of consumers, 1,200; connected load, 100 k.w. for lighting and 200 h.p. in motors. Distribution system is valued at $10,000. **Rates:** Flat rate, for domestic lighting, from $2 to $6, and for commercial lighting, from $3 to $7 per 16-c.p. lamp per year. A discount of 10 per cent is allowed for domestic lighting. Flat rate for power, from $20 to $40 per h.p. per year. Street lighting: 100-w. nitro lamps, at $10 per lamp per year.

GRAND'MERE, Champlain Co. (8,200*). The hydro-electric plant of the Laurentide Power Co.—a part of the system of the Shawinigan Water and Power Co.—is situated here, on the St. Maurice river. Descriptions of the other plants and transmission systems of this company are given under Shawinigan Falls. The local distribution is supplied mainly under municipal control, but also by J. O. H. Ricard, who obtains the energy from the St. Maurice Light and Power Co.

Laurentide Power Co.—Hydro-electric Plant: Concrete gravity dam 1,800 ft. long and a maximum height of 60 ft., divided into two sections by an island; the water is controlled by 18 sluice gates, each 40 ft. in length, operated by a movable crane. The power house, 450 x 180 ft., which is adjacent to the dam, is of steel and brick construction on concrete substructure. Head used, 83 ft. Equipment: six vertical units, with hydraulic works partly completed for three additional. Each unit consists of a 20,000-h.p. turbine, direct connected to a 15,000-k.v.a., 3-ph., 60-cy., 6,600-v. generator, each generator being equipped with its own exciter. Three station transformers, each a single-ph. unit of 9,000 k.v.a. capacity, step the voltage up from 6,600 v. to 100,000 v., 3 ph. for transmission to Shawinigan Falls, while three other station transformers, of 5,000 k.w., step the voltage up from 6,600 v. to 57,000 v. for direct transmission to Quebec, Three Rivers, and other points. The maximum load on this plant cannot very well be separated from that on the whole system of the Shawinigan company, but it is estimated at present to be 55,000 h.p. and will probably reach 75,000 h.p. by the middle of 1918. The plant was placed in operation in 1916, and is valued at approximately $18,000,000. **Transmission Lines:** Electric energy from this plant is transmitted to Shawinigan Falls, Quebec and other points. The lines which form part of the Shawinigan Water Power Co.'s system are comprised in a description of this company under Shawinigan Falls.

Municipal System—Hydro-electric Plant: Situated at Shawinigan Bay, on the Shawinigan river, near its junction with the St. Maurice. Development: concrete dam 70 ft. long by 12 ft. high, with a 4-ft. wood-stave penstock 1,200 ft. long, leading to a concrete power house 40 x 40 ft.; available head, 100 ft. Equipment: two 450-h.p. turbines, each direct connected to a 300-k.v.a., 3-ph., 60-cy., 2,200-v. generator; six 100-k.w. station transformers, stepping the voltage from 2,200 v. to 11,000 v. at 3 ph., 60 cy. Maximum load, 150 k.w. The plant was installed in 1914, and gives continuous service. **Transmission Line:** The transmission line, which extends from the power plant to Grand'mère, is 10 mi. in length and operates at 11,000 v., 3 ph., 60 cy. It comprises a single circuit of three No. 8 copper conductors, sup-

ported by pin-type insulators on wooden poles. Lightning protection, gap arresters with resistances. Cost of line estimated at $12,000. **Substation:** At Grand'mère: six 100-k.w. station transformers, stepping the voltage down from 11,000 v. to 2,200 v. **Distribution:** 8 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 50 line transformers, of 500 k.w. total capacity. Number of consumers, 2,000, including a connected load of 250 h.p. in motors and 50 k.w. in appliances. **Rates:** Monthly flat lighting rate, from 15 cents per 40-w. to 30 cents per 100-w. lamp; the meter rate is 5 cents per k.w.h., with a meter rental; meter heating rate, 2½ cents per k.w.h., with a meter rental; flat power rate, from $18 to $22 per h.p.-year, according to capacity. Street lighting: 150-w. tungsten and nitro lamps, at $13.20 per lamp per year.

J. O. H. Ricard System—This system, which also includes Ste. Flore, obtains a block of 30 h.p. from the St. Maurice Light and Power Co. **Substation:** Two 50-k.w. station transformers, stepping the voltage down from 12,500 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 8 line transformers, of 40 k.w. total capacity. Number of consumers, 90; connected load, 22 k.w. for lighting and 40 h.p. in motors. **Rates:** Flat rate for lighting, 60 cents per 100-w. lamp per month; meter rate for power, from 5 to 6 cents per k.w.h. Street lighting: 32-c.p. lamps.

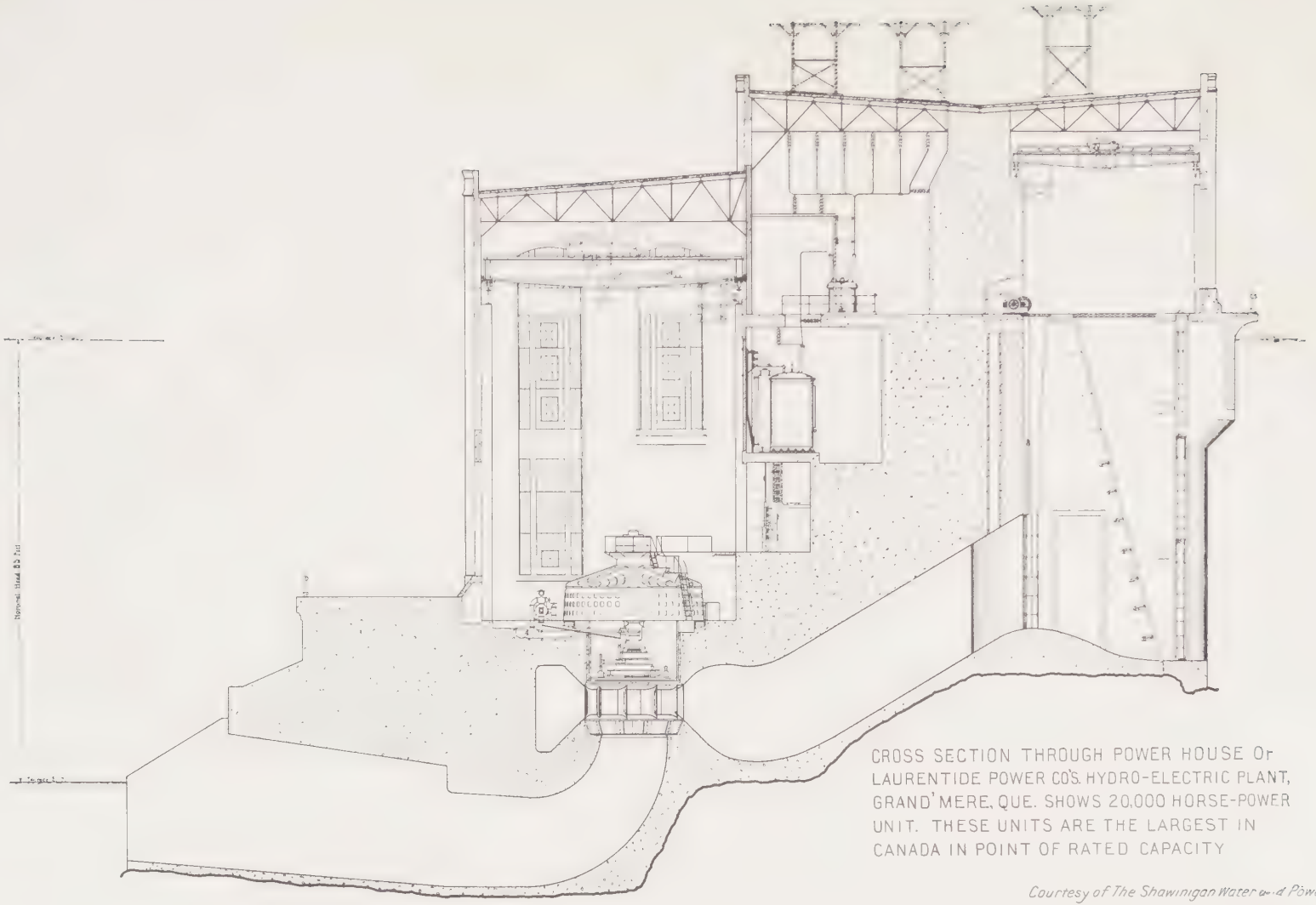
GRENVILLE, Argenteuil Co. (1,383). Supplied by Hawkesbury Electric Light and Power Co. (See under Hawkesbury, Ont.) **Substation:** Two 50-k.w. station transformers, stepping the voltage down from 10,000 v. to 2,300 v. **Distribution :** 2½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; five line transformers, of 40 k.w. total capacity. Number of consumers supplied, 76; connected load, 50 k.w. for lighting. Distribution system valued at $5,000. **Rates:** Yearly flat rate, $3.60 per 16-c.p. lamp; meter rate, 8 cents per k.w.h.; flat rate for power, from $15 to $24 per h.p.-year. Street lighting: 100-w. lamps, at $12 per lamp yearly.

HEBERTVILLE, Lake St. John Co. (655). Supplied by La Cie. Centrale d'Electricité from a hydro-electric plant on Belle river 4 miles above the village. Hébertville Station and St. Bruno are also supplied. **Hydro-electric Plant:** Wooden dam 150 ft. long by 10 ft. high, with a wooden conduit 4 x 5 ft. and 300 ft. long, leading to a frame power house 30 x 25 ft.; available head, 22 ft. Equipment: one 200-h.p. turbine, belted to a 40-k.w., 2-ph., 60-cy., 2,000-v. generator; maximum load, 40 k.w.; night service only. The plant was installed in 1901, and is valued at $10,000. **Distribution:** Including Hébertville Station and St Bruno, 12 mi. of streets, supplied directly at the generator voltage; primaries at 2,000 v. and secondaries at 110 v.; 20 line transformers, of 200 k.w. total capacity. Number of consumers, 225; connected load, 80 k.w. for lighting. Distribution system valued at $10,500. **Rates:** Yearly flat rate, average of $1.75, maximum of $6 per lamp. Street lighting: 100-w. lamps, at $5 per lamp per year.

HEBERTVILLE STATION, Lake St. John Co. Supplied by La Cie. Centrale d'Electricité. See under Hébertville.

HEMMINGFORD, Huntingdon Co. (313). Supplied by Hemmingford Light, Heat and Power Co., which obtains energy in block from H. W. Knapp's hydro-electric plant at Mooers, N.Y., at 5 cents per k.w.h. **Distribution:** 2 mi. of streets; primaries at 2,400 v. and secondaries at 110 v.; four line transformers, of 12 k.w. total capacity. Number of consumers, 55, practically all for lighting. Distribution system valued at $3,400. **Rates:** Meter rate, 10 cents per k.w.h.; flat rate, 25 cents per month per 60-c.p. lamp. Street lighting: 60-w. tungsten lamps, at $12 per lamp per year.

HOWICK, Châteauguay Co. (410†). Supplied by J. G. Dunn, from a hydro-electric plant operated in connection with a mill on the St. Louis river at St. Etienne. St. Louis is also supplied. **Hydro-electric Plant:** Timber and stone dam 90 ft. long by 7 ft. high, with



CROSS SECTION THROUGH POWER HOUSE Of LAURENTIDE POWER CO'S. HYDRO-ELECTRIC PLANT, GRAND'MERE, QUE. SHOWS 20,000 HORSE-POWER UNIT. THESE UNITS ARE THE LARGEST IN CANADA IN POINT OF RATED CAPACITY

Courtesy of The Shawinigan Water and Power Co

a 9 x 9-ft. stone penstock 20 ft. long, leading to frame power house 14 x 30 ft.; available head, 12 ft. Equipment: one 70-h.p. turbine, belted to a 60-k.w., 3-ph., 60-cy., 2,200-v. generator; maximum load, 70 h.p. Slight trouble is sometimes experienced from backwater caused by ice and floods, and also from shortage of water in winter. The plant, installed in 1910, gives only a night service. **Distribution:** 12 mi. of streets; energy transmitted at the generator voltage; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of 60 k.w. total capacity. Number of consumers, 100; connected load, 30 k.w. for lighting. **Rates:** Meter rate, 9 cents per k.w.h., with meterr ental. Street lighting: 60-w. tungsten lamps, at $8 per lamp per year.

HUDSON, Vaudreuil Co. See under Como.

HULL, Ottawa Co. (22,190*). The Hull Electric Co. supplies Hull and Avimer and vicinity from a hydro-electric plant which is also used for electric railway purposes; 700 h.p. of energy is also purchased from the Ottawa and Hull Power Co. (See under Ottawa). The Ottawa Electric Co. also distributes electric energy in Hull. The municipality operates a ocal hydro-electric plant for street-lighting and water-works.

Hull Electric Company Hydraulic Plant: The development, situated on the Ottawa river, at Deschênes, 5 miles above Hull, is effected by a wing dam, affording 9-ft. head. There are two power houses, one of timber, 115 x 43 ft., and one of steel, brick and concrete, 61 x 33 ft.; also two wheel houses, 127 x 23 ft. and 90 x 23 ft., respectively. Equipment: one set of 6 turbines, of 700 h.p. total capacity, operating a line shaft, to which are belted two 150-k.w., monocyclic, 2,300-v., and two 300-k.w., d.c., 600-v. generators; also two sets of turbines, each aggregating 1,000 h.p., geared to line shafts which are direct connected to two 800-k.w., 3-ph., 60-cy., 2,500-v. generators. There are two 800-k.v.a., 3-ph., 60-cy. station transformers, which step the voltage up to 10,000 v. Causes of interruption are surface and frazil ice, and thunderstorms. The plant was originally placed in operation in 1896, and important additions were made in 1900. **Transmission Lines:** The energy is transmitted three miles to Aylmer and six miles to Hull at 10,000 v., 3 ph., 60 cy. The line to Hull consists of two circuits of No. 2 hard-drawn copper wire, and to Aylmer of one circuit of No. 4 wire; both lines supported by pin-type insulators on wooden poles; electrolytic aluminum arresters, at generating station, and graded shunt arresters at substation, afford protection against lightning, while the line itself has an overhead ground wire. **Substations:** Three substations are supplied, two of them in Hull. Transformer equipment: six 250-k.w. units, lowering the voltage from 10,000 v. to 500 v. for power purposes, and two 150-k.w. units, lowering the voltage from 10,000 v., 3 ph. to 2,200 v., 2 ph. for street and interurban railway purposes; the energy received from the Ottawa and Hull Power Co. is also distributed from one of these. The third substation, at Aylmer, is used principally for railway purposes. Transformer equipment: two 150-k.w. units, lowering the voltage from 10,000 v., 3 ph. to 2,200 v., 2 ph. **Systems of Distribution:** Distribution proper, exclusive of transmission lines, covers 28 miles of streets; primaries at 2,200 v. and secondaries at 118 v.; 210 line transformers, with capacities ranging from 0·6 k.w. to 25 k.w. capacity, the average being 5 k.w. Value of street distribution, approximately $100,000. Number of consumers, 2,141; connected load, 1,200 k.w. for lighting alone. **Rates for Hull:** Meter rate for domestic lighting, from 1·1 cents to 2·2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; for commercial lighting, from 0·5 cent to 5 cents per k.w.h., a discount of 10 per cent being allowed in all cases. The meter rate in Aylmer and vicinity is 15 cents per k.w.h., less 33⅓ per cent discount.

Municipal Plant: On branch of Ottawa river. Concrete dam, 20 ft. long and 30 ft. high with adjacent concrete power-house, 20 ft. square. Head, 19 ft. One 1,100-h.p. turbine, direct connected to a 750-k.v.a., 2-ph., 60-cy., 2,200-v. generator. Maximum load, 350 k.w. Installed 1917. Street lighting: 400-c.p. and 600 c.p. nitro lamps.

HUNTINGDON, Huntingdon Co. (1,265). Supplied by J. G. Dunn, from a hydro-electric plant on the Châteauguay river at Powerscourt, 6 miles above the town; also an auxiliary

steam plant, which is seldom used. **Hydraulic Plant:** Concrete dam, 120 ft. long by 5 ft. high, with an open canal 1,800 ft. long, 15 ft. wide and 6 ft. deep, leading to a concrete power house 24 x 24 ft.; available head, 26 ft. Equipment: one 180-h.p. turbine, belted to a 150-k.w., 3-ph., 60-cy., 6,600-v. generator. Slight trouble is experienced from anchor ice. Maximum load, 100 h.p. The plant, which has been in operation since 1915, gives continuous service. **Transmission Line:** The line from Powerscourt to Huntingdon is 6 miles long; it consists of a single circuit of three No. 4 copper conductors supported by pin-type insulators on wooden poles and operates at 6,600 v., 3 ph., 60 cy. Lightning protection, spark gap arresters at each end. **Substation:** three 50-k.w. station transformers, stepping the voltage down from 6,600 v. to 2,200 v., 3 ph., 60 cy. **Steam Plant:** Frame building 40 x 40 ft. Equipment: one 150-h.p. return tubular boiler and one 150-h.p. compound engine, belted to a 75-k.w., single-phase, 60-cy., 2,200-v. generator. Fuel: anthracite screenings and bituminous slack coal. The plant is only auxiliary, and is seldom used, some years not at all. Installed in 1910, and valued at $3,000. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 18 line transformers, of 72 k.w. total capacity. Number of consumers, 200; connected load, 50 k.w. for lighting and 25 h.p. in motors. **Rates:** Meter rate, 9 cents per k.w.h.; yearly flat rate, $3.60 per 60-w. lamp. Street lighting: 100-w. tungsten lamps, at $10 per lamp per year.

HUNTINGVILLE, Sherbrooke Co. Supplied by Southern Canada Power Co. See under Lennoxville.

IBERVILLE, Iberville Co. (1,905). Supplied from St. Johns system See under St. Johns.

JOLIETTE, Joliette Co. (8,625*). Supplied, under municipal control, from two sources, namely, a municipal water-power plant on the L'Assomption river, one mile below the town, and in block from the Laval Electric Co., the latter being transmitted from Shawinigan Falls. **Local Hydraulic Plant:** Crib-work dam, 124 ft. long, with a forebay 13½ ft. wide and 10 ft. deep, terminating in a masonry bulkhead, from which two intake pipes, one 72-in. and one 42-in., and 19 ft. long, lead to a frame power house 40 x 40 ft.; available head, 20 ft. Equipment: one 215-h.p. turbine, belted to a 100-k.w., 2-ph., 60-cy., 2,000-v. generator, and one 100-h.p. turbine, belted to a 55-light, d.c. arc generator. The maximum load is the full capacity of the station, but this is sometimes reduced in winter owing to shortage of water. Value of plant, $50,000; cost of operation, $2,500 per year; first installation, 1889, improvements having been made since. The plant gives a night service only, as the day load is supplied from the purchased energy. **Substation:** Equipment: two 75-k.w. station transformers, stepping the voltage down to 2,200 v. Energy is purchased by the municipality at from 0.4 to 0.7 cent per k.w.h., plus $1.50 per h.p. per month. **Distribution:** 15 mi. of streets; primary voltage, 2,200 v. and secondary 110 v.; 79 line transformers, of from 2 k.w. to 25 k.w., with a total capacity of 595 k.w. Total value of the system, $70,000. Number of consumers, 950; connected load, 300 h.p. in motors. **Rates:** Meter rate, from 2 to 10 cents per k.w.h., according to consumption, with a special rate of 3 cents per k.w.h. for heating appliances; discount, 20 per cent in all cases. Street lighting: arc and 100-w., 150-w. and 250-w. incandescent lamps.

JONQUIERE, Chicoutimi Co. (4,000†). Supplied under municipal control, from a hydro-electric plant in the village on the Au Sable river. **Hydro-electric Plant:** Concrete dam 180 ft. long by 35 ft. high, whence a steel conduit, 7 ft. in diameter and 200 ft. long, leads to a concrete and frame power house 50 x 40 ft.; available head, 45 ft. Equipment: one 550-h.p. turbine, direct connected to a 425-k.w. generator and one 300-k.w. generator belted to the same turbine, all the energy being generated at 3 ph., 60 cy., 2,200 v. Maximum load, 275 k.w., the plant giving a continuous service. Shortage of water is sometimes experienced in February or March. The plant, valued at $27,000, was installed in 1906. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 30 line transformers, of 500 k.w. total capacity. Number of consumers, 850; connected load,

425 k.w. for lighting, 250 h.p. in motors and 35 k.w. in appliances. The system of distribution is valued at $68,000. **Rates:** Meter rate for lighting, 8 cents per k.w.h.; flat rate, from 10 to 50 cents per 50-w. lamp per month; flat rate for power, from $20 to $38 per h.p. per year. Street lighting: from 60-c.p. to 250-c.p. lamps, at 35 cents per 50 w. per month.

KENOGAMI, Chicoutimi Co. Price Brothers & Co., Ltd., have important pulp and paper mills at Kenogami and Jonquière ; portion of energy used is transmitted from a hydro-electric plant at Shipshaw. (See under Shipshaw). Small quantity of energy from mill used in Kenogami village.

KINGSBURY, Richmond Co. (263). Supplied from the Richmond system of Southern Canada Power Co. See under Richmond.

KNOWLTON, Brome Co. (865). Supplied by Southern Canada Power Co. See under Foster.

LAC-AU-SAUMON, Matane Co. (1,171). Supplied by La Compagnie Electrique d'Amqui. See under Amqui.

LACHENAIE, L'Assomption Co. (36†). Supplied by Laval Electric Co. (See under Ste. Thérèse.)

LACHINE, Jacques-Cartier Co. (15,500*). Supplied under municipal control, 1,064 h.p. at $32 per h.p. per year being purchased from the Montreal Light, Heat and Power Consolidated at 10,000 v. (See under Montreal). **Substation:** Three 300-k.w. station transformers, stepping the voltage down from 10,000 v. to 2,200 v. Demand: 500 h.p. for lighting, 384 h.p. for power, and 180 h.p. for street lighting. **Distribution:** 20 mi. of streets with 1·86 mi. underground; primaries at 2,200 v. and secondaries, for power, 550 v., and for lighting, 110 v.; 53 line transformers, of from 1½-k.w. to 20-k.w. capacity. Number of consumers, 2,200 ; connected load, 384 h.p. for lighting and appliances and 500 h.p. for power. It is valued at $200,000. **Rates:** Meter rate for domestic lighting, 7 cents per k.w.h.; for heating appliances, 4 cents per k.w.h., and for power, from 2½ to 3 cents per k.w.h., according to service. Street lighting: 547 nitrogen lamps of from 80 c.p. to 250 c.p., charges based on rate of $35 per h.p. per year.

LACHUTE, Argenteuil Co. (2,407). Supplied by Ayers, Ltd., from a hydro-electric plant on the North river, ¾ mile south of Lachute. The company also supplies Brownsburg, Staynerville, St. Philippe, and the Carillon canal. **Hydro-electric Plant:** Stone-filled crib dam 300 ft. long by 24 ft. high, with an adjacent stone power house 20 x 30 ft.; available head, 24 ft. Equipment: one 250-h.p. turbine, belted to a 120-k.w., 2-ph., 130-cy., 2,200-v. generator; maximum load, 300 h.p. The plant, which gives a night service only, was installed in 1897. The hydraulic development, which is partly completed for 3,000 h.p., is valued at $190,000, but the present electric installation, inciuding the generator and distribution system, is estimated at $28,527. **Distribution:** Including the three places mentioned, 19 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 40 line transformers, of 200 k.w. total capacity. Number of consumers, 500; connected load, 150 k.w. for lighting and 50 k.w. in appliances. **Rates:** Flat rate, 1 cent per 16-c.p. lamp per night; meter rate, 10 cents per k.w.h. Street lighting: 60-w. nitro lamps, at $12.50 per lamp, per year.

LAKE EDWARD, Quebec Co. Supplied by Turner Lumber and Pulpwood Co. from a steam-power plant connected with their mill. **Power Plant:** Brick building, 20 x 35 ft. Equipment: two 60-h.p. return tubular boilers, at 85 pounds pressure, also used for the mill, and a 35-h.p. engine, belted to two 9-k.w., 125-v., d.c. generators. Fuel : mill refuse. Maximum load, 20 k.w.; night service only. The plant was installed in 1914 and is valued at $4,500, including the outside distribution, but exclusive of the boilers. **Distribution:** 2½ mi. of streets or roads, the distribution being at 125 v. and 250 v., d.c. Number of consumers, 25; connected load, 20 k.w. **Rates:** Monthly flat rate, 50 cents per lamp.

LAPRAIRIE, Laprairie Co. (2,388). Supplied under municipal control, a block of 46 h.p. being obtained from the Montreal Light, Heat and Power Consolidated, at $30 per h.p.-year. (See under Montreal.) **Distribution:** 5½ mi. of streets; primaries at 2,200 v. and secondaries for lighting at 110 v. Number of consumers, 160; connected load, 80 k.w. for lighting and 35 h.p. in motors. Value of distribution system, $15,000. **Rates:** Meter rate, for lighting, 10 cents per k.w.h., less a discount of 10 per cent, with a meter rental; rate for power, 4 cents per k.w.h., less 10 per cent discount, with a fixed charge of $15 per h.p.-year and a meter rental. Street lighting: 80-w. tungsten lamps.

L'ASSOMPTION, L'Assomption Co. (1,747). Supplied by Laval Electric Co. See under Ste. Thérèse.

LA-TUQUE, Champlain Co. (4,000*). Supplied by Brown Corporation, from a hydro-electric plant connected with their mills. **Hydraulic Plant:** The development uses the natural fall in the river, without any dam, and comprises two 6-ft. penstocks 2,300 ft. long, leading to two power houses each measuring 32 x 62 ft., where a head of 80 ft. is available. The equipment comprises two 2,100-h.p. turbines, direct connected to two generators of 2,000 k.v.a. and 1,500 k.w., respectively, the energy being generated at 3 ph., 60 cy., 2,300 v. Maximum load, 3,000 h.p., the greater portion of which is used for mill operation. The power plant, which gives a continuous service, was installed in 1909 and is valued at $150,000. **Distribution:** 12 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 600 v.; 23 line transformers, of 204 k.w. total capacity. Number of consumers, 641; connected load, 150 k.w. for lighting and 176 h.p. in motors. The system of distribution is valued at $20,000. **Rates:** Flat rate for lighting, ½ cent per watt per month; meter rate, 5 cents per k.w.h. Street lighting: arc and tungsten lamps, of a total capacity of 13 k.w. at a total of $840 per year.

LAURENTIDES, L'Assomption Co. (1,128). Supplied by Cie. Electrique des Laurentides, from a hydro-electric plant on the Ouareau river, one mile from Rawdon, the latter village, Ste. Julienne, Montcalm Mills, St. Jacques and St. Esprit being also supplied. **Hydro-electric Plant:** Wooden dam 90 ft. long by from 5 ft. to 10 ft. in height, with an iron conduit 6½ ft. in diameter and 40 ft. long, leading to a frame power house 125 x 50 ft.; available head, 24 ft. Equipment: one 300-h.p. turbine, direct connected to a 280-k.w., 3-ph., 60-cy., 6,600-v. generator. Maximum load, 120 h.p. Slight trouble is sometimes experienced from frazil ice. Value of plant, $30,000; cost of generation, $20 per h.p.-year. The plant was installed in 1914 and gives a continuous service. **Distribution:** Including the various places above mentioned, 25 mi. of streets or roads; primaries at both 6,600 v. and 2,200 v. and secondaries at 110 v.; 38 line transformers, of from 3 k.w. to 60 k.w. capacity. Number of consumers, 588; connected load, in appliances alone, 250 k.w. The system of distribution is valued at $20,000. **Rates:** Meter rate for lighting, 10 cents per k.w.h.; for appliances, 3 cents per k.w.h.; for power, 5 cents per k.w.h. Street lighting: 16-c.p. to 100-w. lamps, at $3.75 to $5 per lamp per year, respectively.

LENNOXVILLE, Sherbrooke Co. (1,211). Supplied by the Southern Canada Power Co. (See under Sherbrooke). Huntingville, which is supplied by the same substation, is also included. **Substation:** Equipment: three 100-k.w. transformers, reducing the voltage from 22,000 v. to 2,200 v.; output divided, 60 per cent for power and 40 per cent for lighting. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 37 line transformers, of 277 k.w. total capacity. Number of consumers, 336; connected load, 200 k.w. for lighting, 436 h.p. in motors and 50 k.w. in appliances. **Rates:** Meter rate for lighting, 10 cents per k.w.h. less 25 per cent discount; flat rate for power, from $70 to $130 per k.w. per year, according to amount; meter rate for power, from 0·6 to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. Power rates are subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting: 60-w. tungsten lamps at $10 and $9 per lamp per year.

L'EPIPHANIE, L'Assomption Co. (1,875†). Supplied by Laval Electric Co. (See under Ste. Thérèse).

LEVIS, Lévis Co. (7,452). Supplied by Quebec Railway, Light, Heat and Power Co., from its Chaudière River plant. (See under Quebec). **Substation:** This supplies Lévis and vicinity. Equipment: six station transformers, stepping the voltage down from 10,000 v. to 2,300 v., 3 ph., 63 cy.; additional transformers and motor generators are used for electric railway purposes. The load may be divided into 20 per cent for lighting, 50 per cent for power and 30 per cent for electric railway. **Distribution:** Including the town and vicinity, 45 mi. of streets or roads; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 211 line transformers, of 1,100 k.w. total capacity. Number of consumers, 2,100; connected load, 1,350 k.w. for lighting, 1,470 h.p. in motors and 57 k.w. in appliances. **Rates:** Meter rate, for lighting, 10 cents per k.w.h., less 30 per cent discount, with a monthly minimum of $1; for appliances, from 2·5 to 3·75 cents per k.w.h.; meter rate, for power, from 0·8 to 3 cents per k.w.h. plus a yearly fixed charge of $12 per h.p.; yearly flat power rate, from $30 to $60 per h.p. Street lighting: 40-w. to 80-w. tungsten lamps, at $6.50 to $10 per lamp per year.

LONGUEUIL, Chambly Co. (4,703*). Supplied by Montreal Light, Heat and Power Consolidated, whose system is described under Montreal. A block of 51 h.p. is purchased by the town directly from above company to operate the waterworks and street lighting, at $30 per h.p.-year. The system covers 8 mi. of streets, with primaries at 2,200 v. The street lighting comprises 60-c.p. and 80-c.p. lamps.

LORETTE, Quebec Co. (1,588). Supplied by Quebec Railway, Light, Heat and Power Co. See under Quebec.

LORETTEVILLE, Quebec Co. (1,565†). Supplied by Quebec Railway, Light, Heat and Power Co., from the Valcartier transmission line. See under Quebec. **Substation:** Of the outdoor type, it comprises three 100-k.w. transformers, stepping the voltage down from 24,000 v. to 2,300 v., 3 ph., 63 cy., the load being divided into 33 per cent for lighting and 67 per cent for power. **Distribution:** 3¼ mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 41 line transformers, of from ½ k.w. to 15 k.w. capacity. Number of consumers, 287; connected load, 174 k.w. for lighting and 190 h.p. in motors. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 30 per cent discount, with a monthly minimum of $1; for appliances, from 2·5 to 3·75 cents per k.w.h.; meter rate for power, from 0·8 to 3 cents per k.w.h., plus a yearly fixed charge of $12 per h.p.; yearly flat rate, from $30 to $60 per h.p.

LOUISEVILLE, Maskinonge Co. (1,675). Supplied by Cie. Electrique de Louiseville, from a hydro-electric plant on the Maskinonge river, 9 miles northwest of Louiseville. St. Barthélemi, Maskinonge, Ste. Ursule and St. Justin also supplied from the same plant. **Hydro-electric Plant:** Partly concrete and partly stone-filled crib-work dam, 18 ft. high by 126 ft. long, with wings extending an additional 200 ft. A wood-stave pipe 110 ft. long and 8 ft. in diameter leads to a concrete-and-frame power house 35 x 40 ft. ; available head, 18 ft. Equipment: one 175-h.p. turbine, direct connected to a 100-k.w., 3-ph., 60-cy., 6,600-v. generator. Maximum load, 100 k.w.; cost of generation estimated at $42 per h.p.-year. The plant gives a continuous service. It was installed in 1914 and is valued at $40,000, including water-power rights. The river has a very uniform flow, its headwaters including some thirty lakes. **Transmission Lines:** One line extends to Louiseville and Maskinonge and the other to St. Barthélemi. They have a total length of 20 mi. and operate at 6,600 v., 3 ph., 60 cy.; each consists of a single circuit of three No. 6 copper conductors supported by pin-type insulators on wooden poles. Lightning protection; gap arresters and ground wires on poles. Power supplied at the three substations: Louiseville, 50 k.w.; St. Barthélemi, 25 k.w.; Maskinonge, 25 k.w. Ste. Ursule and St. Justin are supplied directly from the 6,600-v. lines. Total value of transmission lines, $20,000. **Substations:** Equipment at Louiseville, three

transformers of 40 k.w. capacity; at St. Barthélemi, two of 30 k.w., and at Maskinonge, two of 30 k.w., all stepping the voltage down from 6,600 v. to 2,200 v., 3 ph., 60 cy., the output being, approximately, 50 per cent for lighting and 50 per cent for power. **Distribution:** Including the five places supplied, 9 mi. of streets or roads, primaries at 6,600 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 18 line transformers, of 200 k.w. total capacity. Number of consumers, 500; connected load, 250 k.w. for lighting and 90 h.p. in motors. Distribution systems valued at $26,000. **Rates:** Meter rate for lighting, 10 cents per k.w.h., with a monthly minimum of $1; meter rate for power, 3 cents per k.w.h.; flat rate for power, from $30 to $45 per h.p.-year. Street lighting: 40-w. tungsten lamps, at $12 per lamp per year.

MAGOG, Stanstead Co. (4,530†). Supplied, under municipal control, from a hydro-electric plant on the Magog river, 2½ miles below the town. **Hydro-electric Plant:** Concrete dam, 26 ft. high by 150 ft. long, with wing walls on each side extending an additional 450 ft.; three flumes, each 10 ft. in diameter and 45 ft. long, extending from the dam to a concrete power house 30 x 65 ft.; available head, 21 ft. Equipment: two 900-h.p. turbines, each direct connected to a 625-k.v.a., 2-ph., 60-cy., 2,400-v. generator. Maximum load, 1,100 k.w., energy being transmitted direct to the town at 2,400 v. The plant, which gives continuous service, was installed in 1911, and is valued at $170,000, including the lines from the power plant to the town limits. **Distribution:** 15 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 130 line transformers, of 650 k.w. total capacity. Number of consumers, 400; connected load, 125 k.w. for lighting alone. The system is valued at $50,000. **Rates:** Flat rate, for lighting, from 23 to 28 cents per lamp per month; for power, $20 per h.p. per year. Street lighting: 60-w. and 100-w. tungsten lamps; as it is a municipal plant, there is no special charge.

MANIWAKI, Ottawa Co. (1,461). Supplied by Maniwaki Electric Co., from a hydro-electric plant on the Gatineau river, 5 miles south of the town. **Hydro-electric Plant:** Wooden dam, 300 ft. long by 16 ft. high, with three wooden flumes each 12 x 16 ft., leading to a frame power house 20 x 60 ft.; available head, 13 ft. Equipment: one 300-h.p. turbine, belted to a 150-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 265 h.p. The plant, which gives a continuous service, was installed in 1905, and is valued at $15,948. **Distribution:** Energy is supplied directly to the system at the generator voltage; 10 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 11 line transformers, of from 2 k.w. to 5 k.w. capacity. Number of consumers, 125; connected load, 71 h.p. for power alone. Distribution system valued at $6,995. **Rates:** Average flat rate for lighting, $2.50 per lamp per year; rate for power, from $25 to $35 per h.p.-year.

MARIEVILLE, Rouville Co. (1,787*). Supplied under municipal control, 183 h.p. at the rate of $27 per h.p.-year being obtained in block from the Montreal Light, Heat and Power Consolidated. (See under Montreal) **Substation:** Equipment: two 100-k.w. station transformers, stepping the voltage down from 10,000 v. to 2,200 v., 2 ph., 60 cy. Of the energy supplied, 33 per cent is used for lighting and 67 per cent for power. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 7 line transformers, of from 5 k.w. to 15 k.w. capacity. Number of consumers, 200; connected load, 45 k.w. for lighting and 120 h.p. in motors. Distribution system valued at $15,000. **Rates:** Meter rate, for lighting, from 5 to 10 cents per k.w.h., according to consumption, with a meter rental and a monthly minimum; flat rate for power, from $20 to $38 per h.p.-year, according to amount and restrictions in use. Street lighting: 100-w. and 60-w. tungsten lamps, at $12 and $10 per lamp per year, respectively.

MASCOUCHE, L'Assomption Co. (344†). Supplied by the Laval Electric Co. See under Ste. Thérèse.

MASKINONGE, Maskinonge Co. (2,066†). Supplied by Cie. Electrique de Louiseville. See under Louiseville.

MASSAWIPPI, Stanstead Co. (406†). Supplied by Southern Canada Power Co. See under Ayers Cliff.

MASSON, Labelle Co. (1,034). See under Buckingham.

MEGANTIC, Frontenac Co. (2,754*). Supplied by Cie. d'Eclairage Electrique de Megantic, from a producer-gas plant. **Power Plant:** Frame building, 30 x 45 ft., contains a suction gas producer and a 150-h.p. gas engine belted to a 75-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: anthracite pea coal; yearly consumption, 240 tons. Maximum load, 30 k.w.; night service only. The first installation was in 1899, and was steam operated; the first producer-gas plant was installed in 1907. The estimated value, including the system of distribution, is $25,400. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 18 line transformers, of 100 k.w. total capacity. Number of consumers, 250; connected load, 150 k.w. for lighting and 10 k.w. for appliances; none for power. **Rates:** Yearly flat rate for lighting, $6 per 40-w. lamp; meter rate, 12 cents per k.w.h., less 10 per cent, with a meter rental. Street lighting: 40-w. tungsten lamps, at $11 per lamp per year.

MELBOURNE, Richmond Co. (314). Supplied by Southern Canada Power Co. See under Richmond.

MONTCALM MILLS, Montcalm Co. Supplied by Cie. Electrique des Laurentides. See under Laurentides.

MONTEBELLO, Labelle Co. (954). Supplied by Papineauville Electric Co. See under Papineauville.

MONT-JOLI, Matane Co. (2,141). Supplied by Rouleau, Ltée., from a producer-gas plant. **Power Plant:** Frame building, 30 x 30 ft., contains a gas producer and engine of 75 h.p., the latter being belted to a 50-k.w , 3-ph., 60-cy., 2,200-v. generator. Maximum load, 40 k.w.; practically continuous service. A plant had been in operation previously, but the present one was installed in 1917, and, including the outside distribution, is valued at $18,210. **Distribution:** 8 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 14 line transformers, of from 1 k.w. to 10 k.w. capacity. Number of consumers, 127. **Rates:** Meter rate, 10 cents per k.w.h.; flat rate, 1 cent per day for 25-w. lamp. Street lighting: 40-w. lamps.

MONT LAURIER, Labelle Co. (1,643†). Supplied by Laurentian Water and Power Co., from a hydro-electric plant on the Lièvre river in the village. **Hydro-electric Plant:** Concrete-and-stone-filled crib dam 10 ft. high by 250 ft. long, divided into two portions by an island; adjacent brick and concrete power house, 60 x 50 ft., also used for milling purposes; available head, 19 ft. Equipment: one 150-h.p. turbine, belted through a countershaft to a 125-k.v.a., 3-ph., 60-cy., 2,400-v. generator. Maximum load, 100 h.p., being divided into 40 per cent for lighting and 60 per cent for power; continuous service. The plant was installed in 1912, and is valued at $105,000, including the water-power rights, estimated at 2,000 h.p., and also the distribution system. **Distribution:** 5 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 30 line transformers, of 150 k.w. total capacity. Number of consumers, 150; connected load, 70 k.w. for lighting, 84 h.p. in motors, and 21 k.w. in appliances. **Rates:** Yearly flat rate, for lighting, from $2.50 to $6 per lamp, according to number; meter rate, 10 cents per k.w.h., with a monthly minimum of $1 and a meter rental. Flat rate for appliances, 1 cent per watt per year; flat rate for power, from $20 to $40 per h.p.-year, according to amount and restrictions in use. Street lighting: 60-w. nitro lamps, at $6 per lamp per year.

MONTMAGNY, Montmagny Co. (3,889*). Supplied by Basin Electric Light and Power Co., Limited, from a hydro-electric plant on the Sud river in the town. **Hydro-electric Plant:** Wooden dam, 25 ft. high by 400 ft. long, with a steel penstock 7 ft. in diameter and

50 ft. long, leading to a stone-and-frame power house 60 x 40 ft; average available head, 20 ft. Equipment: one 250-h.p. turbine, belted to a 175-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum demand, 125 h.p.; night service only. The plant was installed in 1901, and is valued at $32,000. **Distribution:** 7½ mi. of streets; primaries at 2,200 v. and secondaries at 104 v.; 40 line transformers, of from 1 k.w. to 15 k.w. capacity. Number of consumers, 500, representing 85 k.w. for lighting; the plant is also sometimes operated to carry a 55-h.p. motor load. Distribution system valued at $8,500. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting: 60-w. tungsten lamps, at $10 per lamp per year.

MONTMORENCY, Quebec Co. (3,580*). Supplied by Quebec Railway, Light, Heat and Power Co., at 2,300 v., directly from the Montmorency Fall power plant. (See under Quebec). **Distribution:** This portion of the distribution system extends along the north shore of the St. Lawrence from Beauport to Château Richer, covering some 26 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 78 line transformers, of 600 k.w. total capacity. Number of consumers, 480; connected load, 463 k.w. for lighting and 550 h.p. in motors. **Rates:** Meter rate, for lighting 10 cents per k.w.h., less 30 per cent discount, with a monthly minimum of $1; for appliances, 2½ to 3¾ cents per k.w.h.; meter rate, for power, from 0·8 to 3 cents per k.w.h., plus a yearly fixed charge of $12 per h.p.; the yearly flat rate is from $30 to $60 per h.p. Street lighting: 16-c.p. to 100-w. lamps.

MONTREAL (685,000†). Supplied from a number of hydro-electric plants, some of which have steam auxiliary stations in the city. The greater portion of the supply is generated, transmitted and distributed under the control of the Montreal Light, Heat and Power Consolidated, while the Montreal Public Service Corporation distributes energy obtained from the Canadian Light and Power Co.

Canadian Light and Power Co.—This company owns and operates a large hydro-electric plant at St. Timothée and an auxiliary steam plant in Montreal. **Hydro-electric Plant:** The plant derives power from the Coteau and Cedars rapids of the St. Lawrence, 30 miles above Montreal; a portion, 7 miles in length, of the old Beauharnois canal, enlarged to a water surface width of approximately 150 ft. and a depth of 25 ft., leads the water to a forebay 2,000 ft. long and 700 ft. wide, the lower end of which is closed by a concrete bulkhead which is adjacent to the power house, a head of 50 ft. being secured. The building is of concrete and stone, 180 x 150 ft., and contains 4 units; each unit a 7,200-h.p. set of turbines, direct connected to a 5,000-k.v.a., 3-ph., 60-cy., 2,300-v. generator with two 250-k.w. exciter units, which are driven by independent turbines. There are four 5,000-k.v.a. station transformers, each a 3-ph. unit, stepping the voltage up to 44,000 v. Maximum load, approximately 30,000 h.p.; yearly load factor, 46 per cent. The plant was placed in operation in 1911, the development being designed for future extension up to a capacity of 75,000 h.p. **Transmission Line:** The energy is transmitted to Montreal at 44,000 v. over a transmission line 27 miles long, consisting of two circuits of 3 No. 00 stranded copper conductors supported by pin-type insulators on galvanized steel towers spaced 500 ft. apart; the two circuits are designed to transmit 30,000 h.p. with a loss of 8 per cent. The cost of this line averaged about $11,000 per mile exclusive of the special construction for crossing the St. Lawrence river. Besides the Montreal terminal station, this line also supplies a substation at Beauharnois. **Terminal Station and Auxiliary Steam Plant:** These are in a concrete and brick building, 250 x 50 ft. The steam plant includes three 333-h.p. water-tube boilers at 150 lbs. pressure and a 1,500-k.w. steam turbine unit, energy being generated at 3 ph., 60 cy., 2,300 v. The terminal station equipment comprises four 4,000-k.v.a. station transformers, each a 3-ph. unit, stepping the voltage down from 44,000 v. to 13,200 v., 3 ph., for the hydro-electric energy from St. Timothée, while two 3-ph., 1,875-k.v.a. transformers, stepping the voltage from 2,300 v. to 13,200 v., are used in connection with the auxiliary steam plant. Practically all the energy leaves this station at 13,200 v.; The total connected load supplied may be divided as follows: Street railway, 25 per cent; lighting, 30 per cent; power, 44 per cent; municipal lighting, 1 per cent.

Distribution System of the Montreal Public Service Corporation—The energy for this system is obtained from the Canadian Light and Power Co., a portion of Montreal and vicinity being supplied, including St. Laurent, Montreal East, and Pont-Viau. The total load is 26,000 h.p., the system operating through 12 substations, which contain a total of 65 station transformers, stepping the voltage down from 13,200 v. to 2,300 v., with a total capacity of 40,000 k.w., mostly in units of from 500 k.w. to 3,000 k.w. There are also a number of a.c. to d.c. converter sets for the energy supplied to the tramways. The various substations are supplied and interconnected by feeders, transmitting energy at 13,200 v., the system comprising over 30 miles of these, while there are also 4,400-v. tie-lines between certain substations. The distribution system covers 64 mi. of streets, 4 miles being underground, representing a total of 30 mi. of single cable. Primary distribution voltage, 2,200 v., secondary, from 110 v. to 550 v.; 1,000 line transformers, of from 2½ k.w. to 50 k.w., and of 9,389 k.w. total capacity. Number of consumers, 13,000; total connected load, 43,000 h.p., of which, however, 10,000 h.p. is for the street railway. **Rates:** Meter lighting rate 5 cents per k.w.h.; meter power rate, from 2 to 5 cents per k.w.h., with a minimum charge. Flat power rate, from $30 to $60 per h.p.-year. Street lighting, in certain municipalities, is supplied as follows: 4-amp. magnetite lamps, at $75 per lamp, yearly; 6·6-amp. a.c. arc lamps, at $90 per lamp, yearly; 40-w. tungsten lamps, at $10 per lamp, yearly; 100-w. tungsten lamps, at $35 per lamp per year.

Montreal Light, Heat and Power Consolidated—This company's system is one of the most important in Canada, the concentration of load, or amount of energy disposed of within a certain area, being probably greater than for any other single organization. The energy is supplied from 5 hydro-electric plants, situated, respectively, at Chambly, Lachine rapids, Soulanges, Cedars rapids and Shawinigan falls. The first four are operated under the company's control, while some 40,000 k.w. is purchased from the Shawinigan Water and Power Co., whose plant and system are described under Shawinigan Falls. The company also distributes the whole or a portion of the energy in Westmount, Outremont, Verdun, St. Lambert, Longueuil, Montreal West, St. Louis, and Richelieu, all of which are included in the description of the distribution system given below, while Vaudreuil, Como and Hudson are given separately. Chambly, Lachine, Dorval, Laprairie, Pointe-Claire, Ste. Anne-de-Bellevue, Ste. Geneviève-de-Pierrefonds and Marieville are also supplied in block, while, through the Southern Canada Power Co., St. Johns St. Hyacinthe, Belœil, St. Hilaire and St. Mathias may also be included.

Chambly Plant: Situated on the Richelieu river, at Chambly, 17 miles from Montreal. Development : concrete dam 22 ft. high, one portion 500 ft. long across the river, and another, longitudinal, 1,300 ft. long, forming a head race canal, the latter having a flow section of 300 x 22 ft. Across the lower end is the brick power house, 300 x 50 ft.; available head, 32 ft. Equipment: eight 3,100-h.p. turbines, each direct connected to a 2,000-k.w., 2-ph., 63-cy., 2,200-v. generator, and 2 independently driven exciter units, each of 525 h.p.; 10 station transformers, of 2,750 k.w., step the voltage up from 2,200 v., 2 ph., to 25,000 v., 3 ph.; maximum load, 16,000 k.w. This amount cannot always be obtained from the flow in the river, shortage of water being sometimes experienced during the period from August to February. Plant installed 1898. **Transmission Lines from Chambly:** A number of lines radiate from this plant, the energy being transmitted at 25,000 v., 3 ph., 63 cy. Two extend to Montreal, 17 miles, each of two circuits of 3 No. 00 copper conductors, supported on wooden poles by pin-type insulators, each circuit being designed to transmit 5,000 k.w. Other lines extend to St. Johns and to St. Hyacinthe. The principal substations on the Chambly lines are Montreal, St. Hyacinthe, St. Johns, St. Lambert, Belœil, Marieville, Longueuil and Laprairie.

Lachine Rapids Plant: Power derived from Lachine rapids in the St. Lawrence river, 5 miles above Montreal. Development, longitudinal wing dam of rock-filled crib work 14 ft. high by 2,600 ft. long, connected to the shore by a brick power house, 1,000 x 55 ft., forming a cross dam at the lower end of the headrace; operating head, 14 ft. Equipment: 12 units, turbines being in sets of 6 vertical wheels geared to a horizontal generator shaft; eight 1,200-h.p. sets, each connected to a 750-k.w., 4,400-v. generator, and four 1,500-h.p. sets,

each connected to a 1,000-k.w., 12,000-v. generator, all the energy being generated at 3 ph., 63 cy.; also station transformers stepping voltage up to 12,000 v. for transmission. Maximum load, 10,000 k.w., occurring usually during the period from July to December. Trouble is sometimes experienced in winter and spring from frazil ice and backwater. The plant has been in operation since 1898. **Transmission Lines from Lachine Rapids:** There are 3 transmission lines supplied from the Lachine plant. The two lines to Montreal are 6 mi. long, the energy being transmitted at 12,000 v., 63 cy.; each line consists of four 3-ph. circuits of 3 No. 0 copper conductors, supported in one case on iron poles and in the other on wooden poles by pin-type insulators. The third line extends to Lachine to supply the municipal distribution system.

Soulanges Plant: Situated on the St. Lawrence river 30 miles above Montreal. Water is obtained from the Soulanges canal, whence it flows through an open headrace ½ mi. long, 200 ft. wide and 18 ft. deep, terminating in a concrete bulk-head 30 ft. high with controlling head gates. Four concrete penstocks, 20 ft. square and 50 ft. long, 3 of which are in use, lead to a concrete power house 153 x 80 ft.; available head, 50 ft. Equipment: 3 units, with provision for a fourth, each a 5,200-h.p. horizontal turbine, direct connected to a 3,750-k.w., 3-ph., 63-cy., 4,000-v. generator; six 2,500-k.w. station transformers, stepping voltage up from 4,000 v. to 66,000 v. Maximum demand, 11,000 k.w. The plant, which has been in operation since 1908, carries its greatest load in winter, as the use of water is restricted during the summer by the needs of navigation through the Soulanges canal. **Transmission Line from Soulanges:** Energy is transmitted to Montreal, 30 mi., at 66,000 v., 63 cy., over a single transmission line of one 3-ph. circuit of 3 No. 00 copper cables, supported partly on cedar poles and partly on steel towers by pin-type insulators. Four substations are supplied from this line, Ste. Anne-de-Bellevue, Lakeside, Dorval and Montreal.

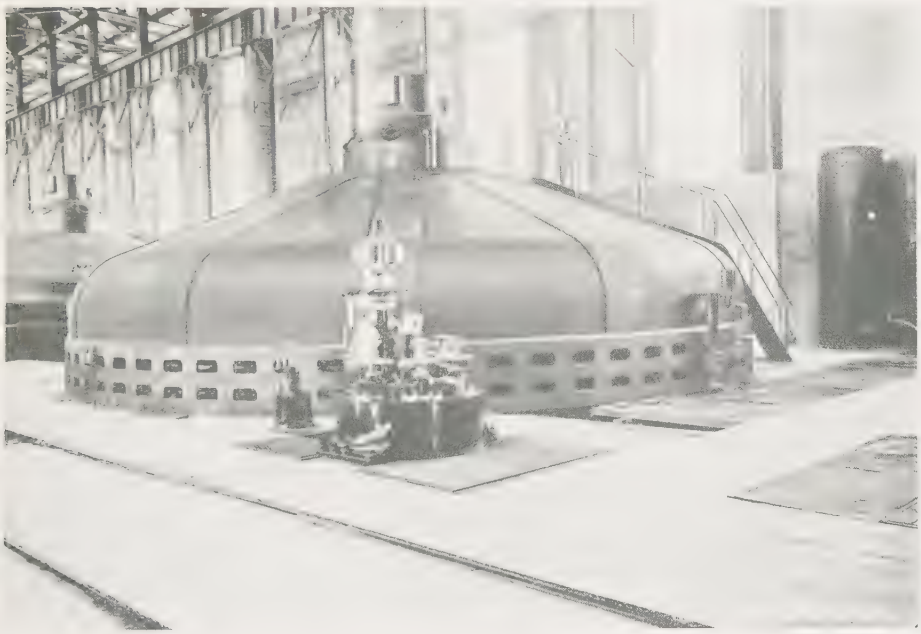
Cedars Rapids Plant: Situated on the north shore of the St. Lawrence river, just below Cedars. Development: rock-filled dyke 2 miles long, paralleling the shore and affording a headrace canal 1,000 ft. wide and 30 ft. deep, whose lower end terminates with the power house; the latter forms the dam joining the dyke to the main bank and affords a head of 30 ft. Provision for protection against ice consists of two spillways, or ice sluices, one at each end of the canal. The steel and reinforced concrete power house is 130 x 1,025 ft., with provision to extend its length to 1,200 ft.; the substructure, which also forms the crossdam, is 1,200 ft. long. Present installation (1918), 12 vertical type units, the ultimate development being designed for 18 of these, each of which consists of a single runner 10,800-h.p. turbine, supported on a thrust bearing carried on top of the generator, the latter having a capacity of 10,000 k.v.a., at 3 ph., 60 cy., 6,600 v. **There are also 3 vertical exciter units of 1,500 h.p. capacity, each independently driven by separate turbines, the 3-ph., 2,300-v. energy from these being used to drive 150-k.w. motor generator sets supplying the direct current for excitation. The equipment also includes benchboards and oil switches, the control being from a point which will ultimately be the centre of the completed power house. The station transformers are in a separate four-storey reinforced concrete building 130 x 220 ft., the energy being transmitted from the power house at 6,600 v. through lead-covered cables. There are nine 8,000-k.w., single-ph. transformers, raising the tension to 110,000 v., 3 ph., 60 cy. in three banks, for transmission of energy to Massena, N.Y., while four 5,000-k.w., single-ph. units, one of them a spare, and three 2,500-k.w. units raise the tension to 66,000 v. for transmission to Montreal. The maximum load on this plant is its full capacity, with a yearly load factor of about 85 to 90 per cent, 90,000 h.p. being transmitted to Massena and 30,000 h.p. to Montreal, The plant has been in operation since the latter portion of 1914 and the cost of the electrical installation for the first development of 100,000 h.p. was $19.27 per k.w., of which $10.04 was for generators, exciters and blowers and $3.02 for total cost of transformer house.‡ **Transmission Lines from Cedars Rapids:** There are 2 transmission lines supplied from this plant, one to Montreal, 30 mi., at 66,000 v., the other to Massena,

**Owing to the low head under which the generators operate, they are run at unusually low speed, namely, 60 rev. per min. This low speed, of course, necessitates unusually large generators.

‡ A detailed description of the Cedars plant may be found in *Transactions, Canadian Society of Civil Engineers*, Vol. XXIX, Part II.

HEADRACE, POWER HOUSE AND TRANSFORMER HOUSE, MONTREAL LIGHT, HEAT AND POWER CONSOLIDATED, CEDARS RAPIDS, RIVER ST. LAWRENCE, SOULANGES CO., QUE.

Ultimate Capacity of Plant, 194,400 h.p.



ONE OF THE 10,800 H.P. UNITS.—MONTREAL LIGHT, HEAT AND POWER CONSOLIDATED HYDRO-ELECTRIC PLANT, CEDARS RAPIDS, RIVER ST. LAWRENCE, SOULANGES CO., QUE.

N.Y., is 48 mi., at 110,000 v. The latter consists of 2 circuits of 3 aluminium conductors, supported by suspension-type insulators on steel towers; each circuit is capable of transmitting 50,000 k.w. with reasonable losses. Lightning protection consists of electrolytic arresters and overhead ground wire along the line.
Steam Plant: Used as auxiliary, the total equipment comprising 7,500 h.p. in water-tube boilers, and 22,000 h.p. in turbo-generators. **Substations:** There are a number of these for the Montreal system, the voltage being stepped down to 12,000 v. and 2,200 v. at 63 cy., both 2 ph. and 3 ph.; the stations are interconnected by underground cables at the former voltage, while 2,200 v. is used for local primary distribution. **Distribution:** The systems under direct control of this company cover approximately 600 mi. of streets with 10 mi. underground; inter-substation feeders at 12,000 v., primaries at 2,200 v. and secondaries at 110 v. to 550 v. Estimated number of consumers supplied directly by the company, 100,000. **Rates:** The lighting rate is 2 to 5 cents per k.w.h., plus a meter rental; for power, the flat rate varies from $16 to $45 per h.p.-year, according to quantity, conditions of supply and restrictions in use. Average rate per k.w.h. output, 1·005 cents, exclusive of power exported to Massena, N.Y., which is sold under a special contract. Street lighting in Montreal: 6·6-amp. magnetite lamps, at $72.70 per lamp yearly; 4-amp. magnetite lamps, at $63.15 per lamp yearly; 80-c.p. tungsten lamps, at $23 per lamp yearly; 40-c.p. tungsten lamps, at $16 per lamp per year.

MONTREAL WEST. Supplied by the Montreal Light, Heat and Power Consolidated. See under Montreal.

MURRAY BAY, Charlevoix Co. (1,685†). Supplied by Nairn Falls Power and Pulp Co. from a hydro-electric plant at Nairn falls, 5 miles distant, on the Murray Bay river. Murray Bay, Point-au-Pic, Cap-à-l'Aigle and St. Irénee also supplied, representing a total population of about 4,000. The plant also supplies power to the company's mill. **Hydraulic Plant:** Concrete dam 200 ft. long; head, 65 ft., with a 15-ft. steel penstock 65 ft. long, leading to a concrete power house 200 x 75 ft. Equipment: a 500-h.p. turbine, direct connected to a 375-k.w., 3-ph., 60-cy., 4,400-v. generator. The plant, which was installed in 1911, and is valued at $52,000, gives a lighting service at night only and has a maximum demand of 500 h.p., divided into 225 h.p. for lighting and 275 h.p. for power, the cost of generation being $15 per h.p. per year. **Transmission Line:** Length of the transmission line to St. Irénée 12 mi., with a branch line from Murray Bay to Cap-à-l'Aigle, 3 mi. long; transmission and primary distribution at 4,400 v., 3 ph., 60 cy. **Distribution:** Secondary distribution at 220 v. and 110 v.; the various systems include 32 line transformers, each of 10 k.w. Value of system, including transmission lines, $18,000. **Rates:** Flat rate, $3 per year per 16-c.p. lamp. Street lighting: 32-c.p. incandescent lamps at $9 per lamp per year.

NEW GLASGOW, Terrebonne Co. (131). Supplied by Bernard Bros., from a water-power plant on Achigan river in the village. **Power Plant:** Wooden dam 3 ft. high by 30 ft. long, giving 19-ft. head. The installation, which is in a flour mill, comprises a 40-h.p. turbine belted to a 6-k.w., 110-v., d.c. generator. Maximum load 5 k.w.; night service only. The plant was installed in 1913, and is valued at $500. **Distribution:** ½ mi. of streets; distribution at 110 v., d.c. Number of consumers, 14; connected load, 5 k.w.; distribution system valued at $500. **Rates:** 30 cents per lamp per month. Street lighting: 40-w. tungsten lamps.

NICOLET, Nicolet Co. (2,593). Supplied by Nicolet Electric Co. from Shawinigan Falls, the electric energy being purchased in block from the St. Maurice Light and Power Co. at 50,000 v., at $23 per h.p.-year. **Substation:** Equipment: one 300-k.w., 30-cy., 3-ph. station transformer, stepping the voltage down from 50,000 v. to 2,200 v. Maximum load, 75 k.w. **Distribution:** 2½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 26 line transformers, of from 5 k.w. to 20 k.w. capacity. Number of consumers, 170; connected load, 38 k.w. for lighting and 83 k.w. for power. The system of distribution is valued at $29,283. **Rates:** Lighting, from 4 to 12 cents per k.w.h., less a discount of 15

per cent; for power, from 1½ to 3 cents per k.w.h., plus a fixed charge of $1 per h.p. per month. Street lighting: 100-w. tungsten lamps, at $12 per lamp per year.

NORTH HATLEY, Stanstead Co. (450†). Electric energy is supplied by the Southern Canada Power Co. (See under Sherbrooke). **Substation:** Equipment: two 50-k.v.a. transformers, reducing the voltage from 22,000 v. to 2,200 v., 3 ph. **Distribution:** 5 mi. of streets; primary voltage, 2,200 v. and secondary 110 v. and 550 v.; 25 line transformers, of from 1 k.v.a. to 15 k.v.a. capacity. Number of consumers, 125; connected load, 50 k.w. for lighting and 93 h.p. in motors. **Rates:** Meter lighting rate, 10 cents per k.w.h., less a discount of 25 per cent, with a monthly minimum; flat power rate, from $70 to $130 per k.w. per annum, according to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. Power rates are subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting: 60-w. tungsten lamps, at $5 per lamp per year.

NORTH WAKEFIELD, Ottawa Co. Supplied by F. T. Cross. See under Farm Point.

NOTRE-DAME-DES-ANGES, Portneuf Co. Supplied by North Shore Power Co. See under St. Casimir.

ORMSTOWN, Châteauguay Co. (782). Supplied by J. B. Walsh, from a hydro-electric plant connected with a grist mill on the Châteauguay river in the town. **Hydraulic Plant:** Dam of stone-filled crib, 120 ft. long by 8 ft. high, with a wood-and-concrete flume, 125 ft. long, 14 ft. wide and 11 ft. deep, leading to the mill, which is of brick, and contains a 175-h.p. turbine, operating under a head of 11 ft., and also used for milling purposes, geared and belted to a 120-k.w., single-ph., 1,100-v. generator. Maximum load, 50 k.w.; night service only; the plant was installed in 1904, and, including distribution system, is valued at $7,000. **Distribution:** 2 miles of streets; primaries at 1,100 v. and secondaries at 110 v. and 220 v., with 10 line transformers, of 60 k.w. total capacity. Number of consumers, 100; connected load, 75 k.w. for lighting. **Rates:** Average yearly flat rate, $3 per 40-w. lamp; meter rate, 10 cents per k.w.h. Street lighting: 60-w. tungsten lamps, at $10 per lamp per year.

OUTREMONT, Hochelaga Co. (12,300†). Supplied by the Montreal Light, Heat and Power Consolidated. (See under Montreal). Street lighting operated by municipality.

Municipal Street Lighting System:—Energy obtained in block from the Montreal Light, Heat and Power Consolidated; amount, 114 k.w., at $36.50 per k.w.-year. **Distribution:** 26 mi. of streets, entirely underground; voltage of distribution, between 2,700 v. and 3,500 v.; 250-c.p. and 400-c.p. nitro lamps; average yearly cost per lamp, $35.11; system valued at $114,000.

PAPINEAUVILLE, Labelle Co. (1,015). Supplied by the Papineauville Electric Co., Ltd., from a hydro-electric plant on the North Nation river, at Portage-de-la-Nation, 5 mi. distant. Montebello, 7 mi., St. André-Avellin, 4 mi., and Portage-de-la-Nation also supplied, representing a total population of approximately 4,000. **Hydraulic Plant:** Wooden crib dam 100 ft. long by 14 ft. high, with two wooden 18-ft. flumes, 100 ft. long, leading to a frame power house 18 x 24 ft.; available head, 20 ft. Equipment: one 350-h.p. waterwheel, belted to a 250-k.w., 3-ph., 60-cy., 2,300-v. generator. One station transformer of 200 k.w. capacity raises the voltage to 10,000 v.; the plant, which was installed in 1905 and is valued at $22,000, operates continuously and has a maximum demand of 150 k.w. Slight trouble from frazil ice is experienced. **Transmission Lines:** The energy is transmitted at 10,000 v., 3 ph., 60 cy., to Papineauville and Montebello, the total mileage of lines being 11 miles, while St. André-Avellin is supplied directly from the power station at 2,200 v., 60 cy., single

ph.; lightning protection consists of arresters at each end of the line. **Substations:** There are two substations, one in Papineauville, the other in Montebello. The equipment of each includes a 25-k.w., single-ph. transformer, reducing the voltage from 10,000 v. to 2,200 v. for Montebello and to 1,100 v. for Papineauville. **Distribution:** 8 mi. of streets; primaries at 1,100 v. and 2,200 v., and secondaries at 110 v. and 220 v.; 25 line transformers, of from 1 k.w. to 7½ k.w. capacity. Number of consumers, 275; approximately 118 k.w. for lighting, 32 k.w. for motors, and 4½ k.w. for street lighting. The connected load also includes various domestic appliances. **Rates:** Flat rate, from $3.12 to $4.16 per 40-w. lamp per year, according to number, while the rate for power averages $25 per h.p. per year. Street lighting: 100-w. tungsten lamps, at $10 per lamp per year.

PHILIPSBURG, Missisquoi Co. (347). Supplied by Missisquoi Marbles, Ltd., from a steam-power plant connected with the mills and quarries, which utilize nearly all the energy thus generated. **Power Plant:** Concrete building, 50 x 60 ft., containing 5 return tubular boilers, 2 of 125 h.p. and 3 of 150 h.p., at 120 lbs. pressure; a 450-h.p. engine, belted through a countershaft to a 250-k.w., double current generator, and a 175-h.p. engine direct connected to a 120-k.w., double current generator, the direct current being generated at 220 v. Fuel: mixture of buckwheat anthracite and bituminous slack coal in equal parts; monthly consumption, 400 tons, at $7 per ton; cost of generation, $55 per h.p.-year. The plant gives continuous service. **Distribution:** 1 mi. of streets; number of consumers, 30; connected load, 10 k.w. for lighting; distribution at 220 v. The consumers are mostly company's employees, no special charge being made for the service. Street lighting: 100-w. tungsten lamps, at $20 per lamp per year.

PIERREVILLE, Yamaska Co. (1,363). Supplied by St. Maurice Light and Power Co., approximately 40 h.p. being obtained in block from the Shawinigan Water and Power Co. **Substation:** Two 100-k.w. station transformers, stepping the voltage down from 50,000 v. to 2,200 v. at 3 ph., 30 cy. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 45 k.w. total capacity. Number of consumers, 90; connected load, 20 k.w. for lighting and 5 h.p. in motors. **Rates:** Meter lighting rate, from 4 to 12 cents per k.w.h. according to consumption, with a minimum monthly charge; flat rate, 60 cents per 100-w. lamp per month; power rate, ½ cent to 3 cents per k.w.h., plus a fixed charge of $1 per h.p. per month. Street lighting: 60-w. tungsten lamps, at $12 per lamp per year.

PLESSISVILLE, Megantic Co. (1,559). Supplied by Cie. Electrique Plessis, being transmitted from Shawinigan Falls and purchased from the Continental Heat and Light Co. at 0·8 cent per k.w.h. Princeville is also included. **Substation:** Three 100-k.w., 30-cy. station transformers, stepping the voltage down from 50,000 v. to 2,000 v., 3 ph. Maximum load, 250 h.p. **Distribution:** 20 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 10 line transformers of from 3 k.w. to 10 k.w. capacity. Number of consumers, 225; the output being divided, 10·6 per cent for lighting, 89 per cent for power, and 0·4 per cent for appliances. Value of system, $24,000. **Rates:** Meter lighting rate, 15 cents per k.w.h., less discounts of from 10 to 40 per cent, according to consumption; meter rate for power, from 1·5 to 2 cents per k.w.h.; for appliances, 5 cents per k.w.h. Street lighting: 40-w. tungsten lamps, at 79·5 cents per lamp per month.

POINTE-CLAIRE, Jacques-Cartier Co. (2,700†). Distributed under municipal control, the description of the system also including Beaconsfield and Baie-d'Urfé. Energy is obtained in block at 2,200 v. from Montreal Light, Heat and Power Consolidated (see under Montreal), from the Lakeside substation on the Cedars transmission line, to an amount of 160 h.p. at $35 per h.p.-year. **Distribution:** Including Beaconsfield and Baie-d'Urfé, 9 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 60 line transformers, of 525 k.w. total capacity. Number of consumers, 365; connected load, 200 k.w. for lighting, 140 h.p. in motors and 150 k.w. in heating appliances. The portion of the system in Pointe-Claire is

valued at $50,500; for portions in other two places, see under each. **Rates:** Meter rate, for lighting, 10 cents, per k.w.h. less 10 per cent discount. Power and heating appliances, 3 cents per k.w.h. less 33⅓ per cent. Street lighting: 100-c.p. nitro lamps.

POINTE-FORTUNE, Vaudreuil Co. (311). Supplied by North River Electric Co. See under St. Andrews.

POINTE-GATINEAU, Ottawa Co. (1,906†). Supplied under municipal control, being obtained in block from the Ottawa Electric Co. at $25 per h.p.-year. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 104 v.; 9 line transformers, of from 3 k.w. to 5 k.w. capacity. Number of consumers, 300; connected power load alone 21 h.p. in motors, in appliances 75 k.w. **Rates:** Flat rate, 0·875 cent per watt per month. Street lighting: 25-w. and 40-w. lamps.

PONT-ROUGE, Portneuf Co. Supplied by Cie. Chas. A. Julien, from a hydro-electric plant on the Jacques-Cartier river in the village. **Hydraulic Plant:** Timber dam 700 ft. long and from 3 to 12 ft. high, with a flume leading to a concrete and frame power house 35 x 25 ft., affording 12-ft. head. Equipment: one 96-h.p. turbine, belted to a 50-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 30 k.w. The plant gives a continuous service, except on Sunday, when it is operated for 12 hours; first operated in 1902, equipment was renewed in 1914; value, $8,000. **Distribution:** 1½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 32 line transformers, of from 2 k.w. to 15 k.w. capacity. Number of consumers, 150; distribution system valued at $6,000. **Rates:** Flat rate, 0·875 cent per lamp per day; meter rate, 10 cents per k.w.h. Street lighting: 40-w. tungsten lamps, at $8 per lamp per year.

PORTAGE-DE-LA-NATION, Labelle Co. Hydro-electric plant of the Papineauville Electric Co. is situated here. See under Papineauville.

PORT ALFRED, Chicoutimi Co. Supplied by Société d'Eclairage du Saguenay. See under Grande-Baie.

PORTNEUF, Portneuf Co. (879†). Supplied by North Shore Power Co., 900 h.p. being obtained in block from the Shawinigan Water and Power Co. St. Bazile is also supplied. **Substation** (situated at St. Casimir): Equipment: station transformers of 600 k.w. total capacity, stepping the voltage down from 50,000 v. to 12,500 v., and 100 k.w. to reduce from the latter voltage to 2,200 v.; load divided, 5 per cent for lighting and 95 per cent for power. **Distribution** (2 systems): 13 mi. of streets, with 10 line transformers, of 605 k.w. total capacity. Number of consumers, 75; connected load, 25 k.w. for lighting and 900 h.p. in motors. **Rates:** Meter rate, from 4 to 10 cents per k.w.h., less 10 per cent discount.

PRINCEVILLE, Arthabaska Co. (752). Supplied by Cie. Electrique Plessis. See under Plessisville.

PROULXVILLE, Champlain Co. Supplied by A. Lambert. See under St. Tite.

PROVIDENCE, St. Hyacinthe Co. (894). Supplied by Southern Canada Power Co. See under St. Hyacinthe.

QUEBEC, Quebec Co. (110,000*). Quebec city is supplied with electric energy from hydro-electric plants situated in various places, with steam auxiliary plants in the city. The Quebec Railway, Light, Heat and Power Co. owns and operates four hydro-electric plants, two on the Montmorency river, 7 miles from Quebec, one on the Jacques-Cartier river, 20 miles distant, and one on the Chaudière river, near its mouth, which supplies both Lévis and

Quebec. This company also obtains power in block from the large hydro-electric plant of the Laurentian Power Co., at St. Féréol, on Ste. Anne Beaupré river, while it has a steam auxiliary plant in the city. The Public Service Corporation of Quebec also distributes electric energy, this being obtained from the Shawinigan Water and Power Co., and transmitted from the Grand'mère plant, 90 miles distant; an auxiliary steam plant is also connected with this system.

The Laurentian Power Company—Present output of this plant transmitted to the Montmorency Falls plant of the Quebec Railway, Light, Heat and Power Co., and sold in block to the latter. **Hydraulic Plant:** On the Ste. Anne river, at Seven falls, near St. Féréol, 6 miles above the mouth. Development: reinforced concrete Ambursen dam, 400 ft. long by 75 ft. high, from which one 8-ft. steel penstock, 3,000 ft. long, leads to a concrete-and-steel power house, 116 x 66 ft.; available head, 410 ft. Equipment: four 6,000-h.p. turbines, each direct connected to a 4,850-k.v.a., 3-ph., 64-cy., 6,600-v. generator, and two 200-h.p. exciter units, the latter being operated by Pelton wheels; nine 1,566-k.v.a. station transformers, to raise the generator voltage to 50,000 v. The plant is operated continuously; present maximum load, 5,000 h.p., but is expected to reach 20,000 h.p. in the near future, No interruption is anticipated as water is stored by means of conservation dams. The plant was installed in 1916, and its value, including storage dams and transmission line, is estimated at $2,000,000. **Transmission Line:** 24 mi., from the power plant to the Montmorency Falls power station of the Quebec Railway, Light, Heat and Power Co.; energy transmitted at 50,000 v., 3 ph., 64 cy.; line consists of galvanized steel towers, supporting two circuits of three No. 0 stranded copper conductors, on pin-type insulators. Each circuit is designed to carry 10,000 k.w., with a 5 per cent loss. Lightning protection, two guard wires and electrolytic lightning arresters at each end of the line. The line is valued at $165,000.

Quebec Railway, Light, Heat and Power Company—Montmorency Hydro-electric Plant: Situated at Montmorency fall, near the mouth of Montmorency river, 7 miles below Quebec. Development: concrete dam 265 ft. long by 22 ft. high, whence a steel conduit of 8 ft. in diam., tapering to 6 ft., and 2,600 ft. long, leads to a stone power house 199 x 52 ft.; available head, 208 ft. The remaining 60 ft. of the total descent of Montmorency fall is utilized below to supply some 1,000 h.p. to a cotton mill. Power house equipment: five 1,000-h.p. turbines, each direct connected to a 600-k.w. generator; four of the latter are 2 ph., 63 cy., 5,500 v., while the fifth is a 600-k w., d.c. generator at 550 v., used for electric railway purposes. Four 1,000-k.w. station transformers step the energy from 5,500 v., 2 ph., to 24,000 v., 3 ph., these being used for the energy from this and the Natural Steps plant; these 3 station transformers of 1,500 k.w., which step the voltage down from 44,000 v. to 24,000 v., 3 ph., 63 cy., are used for the energy from the Laurentian Power Co. The plant was first operated about 1885. **Natural Steps Plant:** Situated one mile above the Montmorency plant on the same river; concrete dam 240 ft. long by some 80 ft. high, forming a reservoir affording pondage for both power houses. A 10-ft. penstock, 80 ft. long, leads to a concrete power house 57 x 50 ft.; available head, 62 ft.; the flow of additional water is controlled through a 12-ft. conduit. Equipment: one 2,000-h.p. turbine, direct connected to a 1,500-k.w., 2-ph., 63-cy., 5,500-v. generator, the energy from this plant being transmitted to the Montmorency plant for transformation and further transmission to Quebec. Maximum load, 1,500 k.w. It was placed in operation in 1906. **Valcartier Plant:** Situated on the Jacques-Cartier river, near Valcartier, 20 miles from Quebec. Development: rock-filled crib dam, 20 ft. high by 400 ft. long, divided into two portions by an island. One end of the dam terminates in a masonry bulkhead, whence two 14-ft. steel conduits lead to a brick and concrete power house 85 x 55 ft., the available head of 30 ft. being raised to 33 ft. by the use of flashboards. There are two 1,500-h.p. turbines, each direct connected to a 750-k.w., 3-ph., 60-cy., 2,000-v. generator. Six station transformers of 333 k.v.a. step the voltage up to 24,000 v., 3 ph. Maximum load, 1,500 k.w. Shortage of water is sometimes felt in winter, but conservation dams are being constructed on lake Jacques-Cartier to overcome this. The plant was installed in 1900. **Chaudière River Plant:** Situated on the Chaudière river at Chaudière fall, 9 mi. west of Lévis. Development: concrete dam, 22 ft. high, in two portions, a cross dam and a longitudinal dam; total length, 1,082 ft.; two 8¼-ft. penstocks,

280 ft. long, lead from this dam to a brick power house 80 x 40 ft.; available head, 114 ft. Equipment: one 2,000-h.p. turbine, direct connected to a 1,000-k.w. generator, and two 1,400-h.p. turbines, each direct connected to a 750-k.w. generator, all the energy being generated at 3 ph., 63 cy., 10,000 v. Maximum load on this plant, 2,500 k.w., used principally to supply Lévis and vicinity, and Lévis County street railway system ; energy may also be supplied to, or received from, the Quebec system. **Montmorency Transmission Lines:** There are two from the Montmorency plant to Quebec, 7 mi. long; each consists of a circuit of three No. 0 copper conductors, supported by pin-type insulators on wooden poles. Energy is transmitted at 24,000 v., 3 ph., 63 cy., the amount being 6,000 k.w., with a loss of 3 per cent. Lightning protection, grounded wires above the conductors and low equivalent arresters at each end. Substation at Quebec is supplied with 6,000 k.w. and at Beauport with 400 k.w. A third transmission line, 15 miles long, extends to Ste. Anne-de-Beaupré. It operates at 24,000 v., 3 ph., 63 cy., and consists of a single circuit of three No. 4 copper conductors, supported by pin-type insulators on wooden poles. Lightning protection, electrolytic arresters. Only one substation, at Ste. Anne, where 600 k.w. is used mostly for electric railway purposes. **Valcartier Transmission Line:** The line from Valcartier to Quebec is 20 miles long, energy being transmitted at 24,000 v., 3 ph., 63 cy. It consists of two circuits of three No. 4 copper conductors, supported by pin-type insulators on wooden poles; both circuits can transmit 2,000 k.w. at an estimated loss of 8 per cent. Lightning protection, low equivalent arresters at the Quebec end and electrolytic type at Valcartier. Substations are supplied at Quebec with 1,300 k.w., and at Loretteville with 200 k.w. The Valcartier Camp is supplied directly from the power plant with 100 k.w. **Chaudière Transmission Line:** The line from Chaudière to Lévis is 9 miles long. It operates at 10,000 v., 3 ph., 63 cy. Two submarine cables across the St. Lawrence transmit a portion of the energy from Lévis to Quebec or *vice versa* at 10,000 v., 3 ph. The line to Lévis has 3 circuits, each of three No. 4 copper conductors supported by pin-type insulators on wooden poles, with a total estimated capacity of 3,000 k.w. at 10 per cent loss. Lightning protection, multigap-type arresters. The line only supplies the Lévis substation, where the demand is 2,500 k.w. **Quebec Auxiliary Steam Plant:** Brick building 100 x 120 ft. Equipment: three water-tube boilers, two of 500-h.p. and one of 200-h.p. capacity, at 150 lbs. pressure, and three 600-h.p. compound condensing engines, each belted to a 350-k.w., 2-ph., 60-cy., 2,200-v. generator. This auxiliary plant, installed in 1903, is seldom operated. **Quebec Substation:** Equipment: 8 station transformers, six of 1,000 k.w. and two of 2,000 k.w., stepping the voltage from both 10,000 v. and 24,000 v., 3 ph. to 2,300 v., 2 ph.; also four motor-generator sets, of 3,400 k.w. total capacity, for electric railway purposes, the total output being divided into 30 per cent for lighting, 45 per cent for power and 25 per cent for electric railway. **Distribution:** Quebec City distribution, which includes the area to the east as far as Giffard and west to Lorette and Cap-Rouge, covers 84 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 524 line transformers, of 6,500 k.w. total capacity. Number of consumers, 9,853; connected load, 8,717 k.w. for lighting, 6,600 h.p. in motors and 180 k.w. in appliances. **Rates:** Meter rate, for lighting, 10 cents per k.w.h., less 30 per cent discount, with a monthly minimum of $1; for appliances, from 2·5 to 3·75 cents per k.w.h.; for power, from 0·8 cent to 3 cents per k.w.h., plus a yearly fixed charge of $12 per h.p. Yearly flat rate for power, from $30 to $60 per h.p.

Public Service Corporation of Quebec—Auxiliary Steam Plant: Brick-and-concrete building 90 x 72 ft., containing four 250-h.p. water-tube boilers, at 180 lbs. pressure, and three steam turbine units, two of which are of 750-k.w. and one of 1,000-k.w. capacity, the generators operating at 3 ph., 63 cy., 2,400 v. Fuel: bituminous coal. The plant is only used in emergencies. One of the generators is constantly in operation, however, as a synchronous condenser for the energy received from Grand'mère. Plant originally constructed in 1912; present value, $200,000. **Substation:** Equipment for energy received from the Shawinigan Co.; three 1,000-k.w. station transformers, stepping the voltage down from 60,000 v. to 2,300 v. at 3 ph., 60 cy.; 2,000 k.w. is received; average load factor, 45 per cent. **Distribution:** 75 mi. of streets, with 6½ mi. underground; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 600 line transformers, of from 1 k.w. to 50 k.w. capacity. Number of

consumers, 6,000; connected load, 3,500 k.w. for lighting and 3,000 h.p. in motors. Distribution system valued at $500,000. **Rates:** Meter rate, for lighting, from 7·25 to 7·75 cents per k.w.h., less 10 per cent discount; rate for appliances, from 1 to 3 cents per k.w.h.; meter rate for power, from 0·68 cent to 3 cents per k.w.h. Street lighting: luminous arc and 60-c.p. and 80-c.p. incandescent lamps, at $46.51 and $8.70 per lamp, yearly, respectively.

RAWDON, Montcalm Co. Supplied by Cie. Electrique des Laurentides. See under Laurentides.

REPENTIGNY, L'Assomption Co. (623†). Supplied by Laval Electric Co. See under Ste. Thérèse.

RICHELIEU, Rouville Co. (332) Supplied by the Montreal Light, Heat and Power Consolidated. See under Montreal.

RICHMOND, Richmond Co. (2,175). Supplied by Southern Canada Power Co., from a local hydro-electric plant on Salmon creek. Kingsbury, Melbourne and Rockland are also supplied from this system, the data for these places being included in the below description. **Hydraulic Plant:** Log dam, 124 ft. long by 31½ ft. high, the water being raised an additional 8 in. by flash boards. A 6½-ft. concrete and wooden penstock, 28 ft. long, leads to a brick power house 27 x 26 ft.; available head, 32 ft. Equipment: two 115-h.p. vertical turbines, geared to two 75-k.w., 3-ph., 60-cy., 2,300-v. generators. Maximum load, 135 k.w.; the plant, installed in 1889, gives continuous service. Practically no water shortage is felt, but the flow is more or less dependent on the operation of mills situated above. **Distribution:** 5½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 60 line transformers, of from ½ k.w. to 25 k.w. capacity. Number of consumers, 460; system valued at $15,500. **Rates:** For lighting, 10 cents per k.w.h., less a discount of 25 per cent, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per annum, according to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w., the power rates being all subject to discounts up to 70 per cent, according to restrictions in use, with additional discounts for special conditions and 10 per cent for prompt payment. Street lighting: 60-w. tungsten lamps, at $15 per lamp per year.

RIGAUD, Vaudreuil Co. (1,700*). Supplied by North River Electric Co. See under St. Andrews. **Rates:** Meter rate, 10 cents per k.w.h. for domestic lighting, 8 cents per k.w.h. for commercial, and from 4 to 6 cents for power.

RIMOUSKI, Rimouski Co. (3,097). Supplied by a private corporation, the Crédit Municipal Canadien, from a hydro-electric plant on the Rimouski river, 3 miles above the town. Bic and Sacré-Cœur also supplied. **Hydro-electric Plant:** A concrete and rock-filled crib dam 210 ft. long by 25 ft. high, with an adjacent brick and concrete power house 40 x 45 ft.; available head, 20 ft. Equipment: one 600-h.p. turbine, belted to two 200-k.w., 2-ph., 2,200-v. generators, one, a 60-cy. machine and the other of 133 cy. Maximum load, 150 k.w., divided 75 per cent for lighting and 25 per cent for power. The plant gives a continuous service. Shortage of water is overcome by conserving it in a lake having an area of 8 square miles. Plant was constructed in 1900, was rebuilt in 1912, and is valued at $194,000, including the distribution system. **Distribution:** Including Bic and Sacré-Cœur, 13 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 40 line transformers, of 225 k.w. total capacity. Number of consumers, 521; connected load, 225 k.w. for lighting 80 h.p. in motors and 20 k.w. in appliances. **Rates:** Flat rate, 1 cent per 25-w. lamp per day; meter rate, 15 cents per k.w.h., with a discount of 15 per cent, plus a meter rental; flat rate for power, from $25 to $40 per h.p.-year, according to amount. Street lighting: 32-c.p. lamps, at $10 per lamp, yearly.

RIVIERE-DU-LOUP, Temiscouata Co. (7,023†). Supplied under municipal control, from a hydro-electric plant on rivière du-Loup in the town. Cacouna is also supplied. **Hydro-electric Plant:** Concrete dam, 20 ft. high by 135 ft. long, with a bulk-head giving an additional length of 25 ft., whence a 4-ft. iron conduit, 160 ft. long, leads to a frame power house 65 x 24 ft.; available head, 92 ft. Equipment: one 275-h.p. turbine, direct connected to a 200-k.w., 2-ph., 133-cy., 2,400-v. generator. Maximum load, 275 h.p.; night service only. Trouble formerly experienced from shortage of water has been overcome by conservation dams on three lakes, one of them having been raised 25 ft. The plant, first installed in 1894, has been rebuilt since; present value, $140,000, including distribution system. **Distribution:** Including Cacouna, 16 mi. of streets; primaries at 2,400 v. and secondaries at 110 v.; 33 line transformers, of 195 k.w. total capacity. Number of consumers, 760; connected load, 575 k.w. for lighting only. **Rates:** Meter rate for lighting, 10 cents per k.w.h., with a monthly minimum of 50 cents and a meter rental. Street lighting: enclosed arc lamps and tungsten lamps of 100 w. to 250 w., at 25 cents for the arc lamps and 3 cents for the tunsgten lamps per night.

RIVIERE-DU-MOULIN, Chicoutimi Co. (550*). Supplied by Société d'Eclairage et d'Energie Electrique du Saguenay. See under Chicoutimi.

ROBERTSON, Megantic Co. (603). Supplied by Robertsonville Electric Co., 30 h.p. being obtained from the St. Francis Water Power Co. at 2,200 v. **Distribution:** 1¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 5 line transformers, of 30 k.w. total capacity. Number of consumers, 89; connected load, 400 k.w. for lighting. Value of system, $3,000. **Rates:** Flat rate for lighting, $4.25 per 16-c.p. lamp per year. Electric energy is also supplied for power purposes directly by the St. Francis Water Power Co. See under Disraeli.

ROBERVAL, Lake St. John Co. (1,948*). Supplied, under municipal control, from a hydro-electric plant on the Ouiatchuanish river 4 miles northwest of the village. **Hydro-electric Plant:** Concrete dam 17 ft. high by 246 ft. long, including wings, the main dam being only 126 ft. long. A 4-ft. steel pipe, 250 ft. long, leads to a brick power house 30 x 40 ft.; available head, 45 ft. Equipment: one 120-h.p. turbine, belted to two generators, one of 120 k.w. and the other of 50 k.w., single-ph., 2,080 v. Maximum load, 96 k.w.; night service only; estimated cost of power, $45 per h.p.-year. Slight trouble sometimes experienced from low water in March. The plant was first installed in 1896, with additions in 1904; present value, including distribution system, $50,000. **Distribution:** Supplied directly at generator voltage, and, including the supply line from the power plant, covers a total of 9 mi. of streets; primaries at 2,080 v. and secondaries at 104 v.; 30 line transformers, of from 1 k.w. to 25 k.w. Number of consumers, 234; connected load, 95 k.w. **Rates:** Monthly flat rate, from 25 to 60 cents per 60-w. lamp, according to number; meter rate, from 12 to 15 cents per k.w.h., less a 20 per cent discount, with a minimum charge and a meter rental. Street lighting: 100-w. nitro lamps, at $9 per lamp yearly.

ROCK ISLAND, Stanstead Co. (1,159†). Supplied by Southern Canada Power Co. **Substation:** This is supplied from the Sherbrooke transmission system (see under Sherbrooke) and carries a load of 300 k.w., the output being divided into 21 per cent for lighting and 79 per cent for power. Equipment: 3 station transformers, stepping the voltage down from 22,000 v. to 2,200 v. **Distribution:** 4½ mi. of streets; primaries at 2,200 v. and secondaries at from 110 v. to 550 v.; 19 line transformers, of from 2½ k.w. to 15 k.w. and of 115 k.w. total capacity. Number of consumers, 241. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 25 per cent discount with a monthly minimum of $1.25. Power rates are the standard for the company given under Sherbrooke, which see. Street lighting: enclosed arcs at $50 per lamp yearly, also 60-w. and 40-w. tungsten and 16-c.p. lamps at $15, $12 and $5 per lamp, yearly, respectively.

OUTDOOR SUBSTATION, SOUTHERN CANADA POWER CO.'S SYSTEM, QUE.

CONTROL SLUICE GATES, SHAWINIGAN WATER AND POWER CO., SHAWINIGAN FALLS, RIVER ST. MAURICE, ST. MAURICE CO., QUE.

ROCKLAND, Richmond Co. Supplied from the Richmond system of the Southern Canada Power Co. See under Richmond.

ROUGEMONT, Rouville Co. (336*). Supplied by A. N. Dufresne. See under St. Césaire.

ROXTON FALLS, Shefford Co. (873). Supplied by T. Mainville, from a combined hydro-electric and steam plant on the Black river in the village. The development is also utilized to operate a saw mill. **Water-power Plant:** Reinforced concrete dam 90 ft. long by 8 ft. high, with an adjacent brick and concrete power house 36 x 26 ft., affording a head of 27 ft. Equipment: one 107-h.p. turbine, geared and belted to a 50-k.w., single-ph., 133-cy., 1,100-v. generator. Maximum load, 60 h.p.; night service only. The hydraulic portion of the plant was installed in 1912. The steam portion of the plant comprises one 80-h.p. return tubular boiler, at 110 lbs. pressure, and one 80-h.p. engine belted to the same generator as operated by the turbine. The steam plant is used only as auxiliary during low water, but no shortage has been felt since 1913. The total value of the power plant is $8,000. **Distribution:** 5 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 9 line transformers, of 25 k.w. total capacity. Number of consumers, 95; connected load, 55 k.w. for lighting and 2 k.w. in heating appliances. Value of distribution system, $5,000. **Rates:** Flat rate, from 25 to 45 cents per 40-w. lamp per month, according to number; meter rate, 12 cents per k.w.h., with a minimum charge and meter rental. Street lighting: 60-w. lamps, at $10 per lamp yearly.

STE. AGATHE, Terrebonne Co. (2,600*). Supplied, under municipal control, from a hydro-electric plant on the North river, 2 miles northeast of the town. **Hydro-electric. Plant:** Concrete dam, 10 ft. high by 150 ft. long, with a 75-in. wood-stave pipe 1,200 ft. long leading to a concrete power house 27 x 30 ft.; available head, 50 ft. Equipment: two 200-h.p. turbines, direct connected, respectively, to a 150-k.v.a., and a 125-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 150 k.w.; the plant gives continuous service. First plant was installed in 1898, but has since been rebuilt; present value, $98,000, including supply lines and distribution system. **Distribution:** Including the supply line from the power plant, 18 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 60 line transformers, of 300 k.w. total capacity. Number of consumers, 364; connected load, 175 k.w. for lighting, 125 h.p. in motors, and 50 k.w. in appliances. **Rates:** Meter rate, 7·5 cents per k.w.h., less 5 per cent discount, with a meter rental; for heating appliances, 3 cents per k.w.h., less 5 per cent discount; flat rate for power, $20 per h.p.-year. Street lighting: 60-w. tungsten and 100-w. nitro lamps.

ST. ALBAN, Portneuf Co. Supplied by La Cie. Hydraulic de Portneuf. See under Deschambault.

ST. ANDRE-AVELLIN, Labeile Co. (407†). Supplied by Papineauville Electric Co. See under Papineauville.

ST. ANDREWS, Argenteuil Co. Supplied by North River Electric Co. from a hydro-electric plant on the North river, 5 miles from its mouth. Carillon, Pt. Fortune and Rigaud in Quebec and St. Eugène in Ontario are also supplied. **Hydro-electric Plant:** Timber dam, 150 ft. long by 12 ft. high, with an adjacent frame power house 22 x 14 ft.; available head, 15 ft. Equipment: two turbines, one of 250 h.p. and another of 135 h.p., belted, respectively, to a 210-k.w. and a 95-k.w. generator, energy being generated at 3 ph., 60 cy., 2,300 v.; energy is also stepped up to 8,900 v. for transmission to Rigaud and St. Eugène. Maximum load, 200 h.p. Slight trouble is experienced both from backwater and shortage of water, but the latter could be overcome by conservation reservoirs at Rainbow and other lakes. The plant, which was installed in 1912, gives a continuous service, and, including water-power rights, is valued at $60,000. **Transmission Lines:** The 8,900-v. transmission lines cover some 20 mi. and consist of a single circuit of three conductors. They supply Rigaud, where the substation equipment comprises two 20-k.w. station transformers, and St. Eugène, where there is a 15-

k.w. transformer. **Distribution:** Including the various places mentioned, 10 mi. of streets; primaries at 2,400 v. and secondaries at 110 v.; 20 line transformers, of 99 k.w. total capacity. Number of consumers, 320. Value of transmission and distribution system, $45,000. **Rates:** In St. Andrews, Carillon, Point Fortune and St. Eugène, lighting is supplied on the flat rate at $3.65 per 25-w. lamp per year. Street lighting: 25-w. to 250-w. lamps, at from $5 to $10 per 40-w. lamp yearly.

STE. ANGELE, Nicolet Co. See under Three Rivers.

STE. ANNE, Chicoutimi Co. (800*). Supplied by La Société d'Eclairage et d'Energie Electrique du Saguenay. See under Chicoutimi.

STE. ANNE-DE-BEAUPRE, Montmorency Co. (2,145†). Supplied by Quebec Railway, Light, Heat and Power Co. See under Quebec. **Substation:** Equipment: three 150-k.w. station transformers, stepping voltage down from 24,000 v. to 2,300 v., 3 ph., 60 cy., and a 500-k.w. motor-generator for railway purposes, the load being divided into 8 per cent for lighting and 92 per cent for railway. **Distribution:** 1 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 8 line transformers, of 40 k.w. total capacity. Number of consumers, 60; connected load, 63 k.w. for lighting and 12 h.p. in motors. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 30 per cent discount, with a monthly minimum of $1; for appliances, from 2·25 to 3·75 cents per k.w.h.; meter rate for power, from 0·8 cent to 3 cents per k.w.h., plus a yearly fixed charge of $12 per h.p.; yearly flat power rate, from $30 to $60 per h.p. Street lighting: 40-w. tungsten lamps, at $12 per lamp yearly.

STE. ANNE-DE-BELLEVUE, Jacques-Cartier Co. (1,971*). Supplied under municipal control, 100 h.p., at $35, being obtained in block from the Montreal Light, Heat and Power Consolidated, at 2,200 v., from the Ste. Anne substation. **Distribution:** 5 mi. of streets, of which 1,200 ft., for canal lighting, is underground; primaries at 2,200 v. and secondaries at 110 v.; 31 line transformers, of 155 k.w. total capacity. Number of consumers, 270; connected load, 95 k.w. for lighting, 70 h.p. for municipal purposes. Entire system valued at $35,000. **Rates:** Meter rate for lighting, 10 cents net per k.w.h. Street lighting: 60-w. nitro lamps.

ST. ANSELME, Dorchester Co. Supplied by Deblois & Veuilleux from a hydraulic plant on Etchemin river. **Hydraulic Plant:** Concrete dam, 210 ft. long by 5 ft. high, with a concrete flume, 160 ft. long, leading to a frame power house 28 x 30 ft.; available head, 8 ft. Equipment: one 65-h.p. turbine, belted to a 50-k.w., 2-ph., 125-cy., 2,200-v. generator. Maximum load, 25 k.w.; night service only. Slight trouble is sometimes experienced from ice. The plant was installed in 1914. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 37 k.w. total capacity. Number of consumers, 158. **Rates:** Flat rate, from $2.75 to $4.50 per 50-w. lamp per year, according to number.

ST. BARNABE, St. Maurice Co. Supplied by La Cie. d'Eclairage de Yamachiche. See under Yamachiche.

ST. BARTHELEMI, Berthier Co. Supplied by La Cie. Electrique de Louiseville. See under Louiseville.

ST. BAZILE, Portneuf Co. (535†). Supplied by North Shore Power Co. See under Portneuf.

ST. BONIFACE, St. Maurice Co. Supplied by La Cie. d'Eclairage de Yamachiche. See under Yamachiche.

ST. BRUNO, Lake St. John Co. (356†). Supplied by La Cie. Centrale d'Electricité. See under Hébertville.

ST. CANUTE, Two Mountains Co. Supplied by J. U. Foucher & Co. See under Ste. Scholastique.

ST. CASIMIR, Portneuf Co. (1,706†). Supplied by North Shore Power Co., a block of 1,200 h.p. being obtained from the Shawinigan Water and Power Co. to supply the district, which also includes St. Marc, Montauban and Notre-Dame-des-Anges. **Substation** (at St. Casimir): Equipment: station transformers, of 900 k.w. total capacity, step the voltage down from 50,000 v. to both 25,000 v. and 12,500 v., and others of 300 k.w. to reduce from the latter voltages to 2,200 v.; load divided, 2 per cent lighting and 98 per cent power. **Distribution:** Including the various systems, 30 mi. of streets; 35 line transformers, of 1,450 k.w. total capacity. Number of consumers, 228; connected load, 37 k.w. for lighting and 1,769 h.p. in motors. **Rates:** Meter rate, from 4 to 10 cents per k.w.h., less 10 per cent discount. Street lighting: 60-w. tungsten lamps, at $12.50 per lamp yearly.

ST. CESAIRE, Rouville Co. (935*). Supplied by A. N. Dufresne, from a hydro-electric plant, on the Yamaska river, 2 miles distant. Rougemont also supplied. **Hydro-electric Plant:** Wooden dam, 250 ft. long by 10 ft. high, with a concrete flume 16 ft. wide and 100 ft. long, leading to a frame power house 24 x 24 ft.; 11-ft. head afforded. Equipment: two 150-h.p. turbines, geared and belted to a 120-k.w., 2-ph., 60-cy., 2,200-v. generator. Maximum load, 150 h.p.; practically continuous service. Slight trouble is experienced from backwater in the spring and low water in the summer. Plant installed in 1902; value, $18,000. **Distribution:** Including the supply line, 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of from 2 k.w. to 15 k.w. capacity. Number of consumers, 210; connected load includes 9 motors and 9 k.w. in appliances. **Rates:** Flat lighting rate, from 10 to 25 cents per lamp per month; power rate, $20 per h.p.-year. Street lighting: 60-w. lamps.

ST. CHRYSOSTOME, Châteauguay Co. (533†). Supplied by L. N. Preville, from a gasolene engine plant. **Power Plant:** One 3½-h.p. gasolene engine, belted to a 1½-k.w., 110-v., d.c. generator. Maximum load, 1½ k.w.; fuel consumption, ¼ gal. per hour. The plant, which is valued at $1,250, was installed in 1914 and gives a night service only. **Distribution:** ⅛ mi. of streets; energy at 110 v., d.c. Number of consumers, 9; connected load, 15 k.w. Distribution system valued at $250. **Rates:** Yearly flat rate, $3 per lamp.

ST. COME, Beauce Co. Supplied by the Cie. d'Energie Electrique de St. Côme, 20 h.p. at $25 per h.p.-year being obtained from the T. Lessard system of St. George Beauce. See under St. George. **Transmission Line:** 6½ mi. long, operating at 6,600 v. **Substation:** One 30-k.w. transformer steps the voltage down from 6,600 v. to 2,200 v., single-ph., 60 cy. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 5 line transformers, of 21 k.w. total capacity. Number of consumers, 72. Street lighting: 60-w. lamps, at $4.80 per lamp yearly. Value of system, including the transmission line, $5,300. **Rates:** Flat rate, 1 cent per watt per month.

ST. CYRILLE, Drummond Co. (711). Supplied by Southern Canada Power Co. See under Drummondville.

ST. ELIE, St. Maurice Co. (1,008†). Supplied by La Cie. d'Eclairage de Yamachiche. See under Yamachiche.

ST. ESPRIT, Montcalm Co. Supplied by La Cie. Electrique des Laurentides. See under Laurentides.

ST. EUSTACHE, Two Mountains Co. (996). Supplied by Laval Electric Co. See under Ste. Thérèse.

ST. FELICIEN, Lake St. John Co. (581). Supplied by St. Félicien Hydro-Electric Co., from a water-power plant on Ours river, 5 miles above the village. **Hydro-electric Plant:** Dam, 100 ft. long by 12 ft. high, partly concrete and partly rock-filled crib, with a 5-ft. wood-stave flume, 800 ft. long, leading to a frame power house 30 x 35 ft.; available head, 70 ft. Equipment: one 250-h.p. turbine, direct connected to a 170-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 70 k.w.; practically continuous service. Plant was installed in 1916 and is valued at $15,000. **Distribution:** including the supply line to the village; 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 8 line transformers, of 30 k.w. total capacity. Number of consumers, 110; connected load, 30 k.w. for lighting and 60 h.p. in motors. Distribution system valued at $15,000. **Rates:** Yearly flat rate for lighting, $7.00 per 25-w. lamp; for power, $35 per h.p.-year, or 15 cents per k.w.h.

STE. FLORE, St. Maurice Co. (530†). Supplied by J. O. H. Ricard. See under Grand'mère.

ST. FRANCOIS-DE-SALES, Laval Co. (785†). Supplied by Laval Electric Co. See under Ste. Thérèse.

ST. GABRIEL-DE-BRANDON, Berthier Co. (1,602). Supplied under municipal control, a block of 300 h.p. being purchased from Laval Electric Co., at 1 cent per k.w.h. **Substation:** Three 50-k.w. station transformers step the voltage down from 12,000 v. to 2,200 v., 3 ph., 30 cy.; owned jointly by the municipality and the supply company. Of the demand, 22 per cent is for lighting and 78 per cent for power purposes. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries, for lighting, at 110 v.; 5 line transformers, of 40 k.w. total capacity. Number of consumers, 150; connected load, 75 k.w. for lighting, 175 h.p. in motors, and 5 k.w. in appliances. Distribution system valued at $22,000. **Rates:** Meter rate, 10 cents per k.w.h., less 10 per cent discount, with a monthly minimum or meter rental. Street lighting: 100-w. tungsten lamps.

STE. GENEVIEVE, Champlain Co. (408†). Supplied by North Shore Power Co. See under St. Narcisse.

STE. GENEVIEVE-DE-PIERREFONDS, Jacques-Cartier Co. (400*). Supplied by Pierrefonds Electric Co., being obtained in block from the Montreal Light, Heat and Power Consolidated, at 2,200 v. and purchased at 2·5 cents per k.w.h. **Distribution:** Including Isle Bizard, 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of from 2½ k.w. to 15 k.w. capacity. Number of consumers, 70; connected load 50 k.w. for lighting and 33 h.p. in motors. Value of system, $15,000. **Rates:** Meter rate for lighting, 10 cents per k.w.h. Street lighting: 60-c.p. nitro lamps, at $20 per lamp yearly.

ST. GEORGE, BEAUCE, Beauce Co. (1,410). Supplied by Beauce Electric Co. See under St. Joseph-de-Beauce, Beauce. Also by T. Lessard, from a hydro-electric plant on the Chaudière river at Jersey Mills, which also supplies St. Côme.

T. Lessard System—Hydro-electric Plant: Concrete dam, 270 ft. long by 8 ft. high, with an open concrete flume 13 ft. wide, 9 ft. high and 25 ft. long, leading to a concrete power house 22 x 30 ft.; available head, 20 ft. Equipment: one 350-h.p. turbine, belted to a 250-k.w., 6,600-v., 3-ph., 60-cy. generator. Maximum load, 75 k.w.; night service only. Slight trouble is sometimes experienced from frazil ice. The plant was installed in 1913, and is valued at $12,000. **Distribution:** Including the supply line at 6,600 v. from power plant, 15 mi. of streets or roads; primaries at 6,600 v. and secondaries from 110 v. to 550 v.; 15 line transformers, of 100 k.w. total capacity. Number of consumers, 200; connected load, 65 k.w. for lighting and 25 h.p. in motors. Distribution system valued at $18,000. **Rates:** Yearly flat rate, $4.00 per 16 c.p.

Beauce Electric System—Substation: Two 25-k.w., single-ph. station transformers step the voltage down from 15,000 v. to 2,200 v. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 60 k.w. total capacity. Number of consumers, 100; connected load, 32 k.w. for lighting and 25 h.p. in motors. **Rates:** Yearly flat rate for lighting, from $4.20 to $6 per 16 c.p. and 15 cents per watt for high efficiency lamps; net meter rate, 11·25 cents per k.w.h., plus meter rental, with a yearly minimum of $1 per lamp; meter rate for power, from 1 to 2 cents per k.w.h., plus a monthly fixed charge of $1.50 per h.p.; flat rate for power, $30 per h.p.-year.

ST. GERARD, Wolfe Co. Supplied by St. Francis Water Power Co. See under Disraeli.

ST. GERMAIN, Drummond Co. Supplied by Southern Canada Power Co. See under Drummondville.

ST. HILAIRE, Rouville Co. (558*). Supplied both under municipal control and by the Southern Canada Power Co., the municipal system obtaining a block of 15 h.p. at $40 per h.p.-year, from the latter. **Substation:** Three 100-k.w. station transformers step the voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. The Belœil powder factory, which requires 350 h.p., and Belœil village are also supplied from this substation, which is the property of the Southern Canada Power Co., and is supplied from the Chambly plant of the Montreal Light, Heat and Power Consolidated. **Distribution:** The two systems cover 4 mi. of streets, mostly under municipal control; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 17 line transformers, of 62 k.w. total capacity. Number of consumers, 78; connected load, 35 k.w. for lighting. Estimated value of the two systems, $12,000. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting: 80-w. tungsten lamps.

ST. HUBERT (Chemin Taché P.O.), Temiscouata Co. Supplied by J. H. Massé, from a water-power plant on the Senescoupé river, connected with a saw and grist mill. **Hydraulic Plant:** Installed in the mill; one 9-h.p. turbine, operating under a head of 12 ft. and belted to a d.c. generator operating at 125 v.; an auxiliary oil engine of 8-h.p. capacity is used when shortage of water is experienced. The system supplies 41 consumers.

ST. HUGUES, Bagot Co. (470). Supplied by Southern Canada Power Co., being obtained from Bazinet & Frères, who have a combined water-power, producer-gas and steam plant on the Chibouet river, one mile below the village, which is also used to operate a mill. **Power Plant:** Concrete dam, 90 ft. long by 12 ft. high, affording 27-ft. head. The equipment is installed in the mill adjacent to the dam. It comprises a 75-h.p. overshot wheel 20 ft. in diameter and a turbine connected through gears and belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. The plant, which was installed in 1915, may also be operated by two 50-h.p. producer-gas engines or by steam. Maximum load, 25 k.w.; night service only. **Distribution:** 1½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 30 k.w. total capacity. Number of consumers, 40; connected load, 20 k.w. for lighting and 5 k.w. in appliances. Distribution system valued at $12,000. **Rates:** Meter rate, 10 cents per k.w.h., with a monthly minimum of $1.25. Street lighting: 60-w. lamps, at $12 per lamp yearly.

ST. HYACINTHE, St. Hyacinthe Co. (11,215†). Supplied by Southern Canada Power Co., from a combined hydro-electric and steam plant on the Yamaska river, 5 miles below the city; 600 k.w. is also purchased from the Montreal Light, Heat and Power Consolidated, at from $18 to $22 per h.p.-year, according to quantity. This system also supplies Providence, Ste. Rosalie and St. Joseph-de-St. Hyacinthe. **Power Plant:** Hydraulic: stone-filled crib dam, 12 ft. high by 750 ft. long, with an open head-race 500 ft. long and 40 ft. wide, leading to a frame power house 80 x 40 ft.; available head, 14 ft. Equipment: one 400-h.p. turbine, geared to a 400-k.w., 3-ph., 60-cy., 6,600-v. generator. Maximum load, 300 k.w., the plant being used intermittently. Trouble is sometimes experienced from low water in August and

September. Steam plant: two 150-h.p. boilers at 120 lbs. pressure, and two 150-h.p. condensing engines belted through a countershaft to the generators normally operated by water-power. The steam plant, which uses run-of-mine coal, at $10.50 per ton, is only used as an auxiliary, particularly during low-water periods. The hydraulic portion of the plant was installed in 1894 and the steam in 1895; total value, $150,000. **Substation:** This is used for the energy received both from the power plant and that purchased from the Montreal Light, Heat and Power Consolidated. Equipment: three 500-k.w. transformers, stepping the voltage down from 22,000 v. to 2,200 v. and three 150-k.w. transformers, stepping the voltage down from 6,600 v. to 2,200 v., all at 3 ph., 60 cy.; load divided 50 per cent for lighting and 50 per cent for power. **Distribution:** Including the other three places mentioned, 17 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 125; line transformers, of 725 k.w. total capacity. Number of consumers, 1,200; connected load, 1,750 k.w. for lighting, 500 h.p. in motors and 675 k.w. in appliances. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 25 per cent discount, with a minimum charge; for cooking, 4 cents per k.w.h., less 25 per cent discount; flat rate for power, from $70 to $130 per k.w. per annum, according to amount; meter power rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. The power rates are subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting: St. Hyacinthe, under municipal control outside places, 60-w. and 100-w. lamps at $12 and $18 per lamp per year, respectively.

St. Hyacinthe Municipal Street Lighting System—The energy, which is also used for other municipal purposes, is purchased from the Southern Canada Power Co., at 1 cent per k.w.h. The energy consumed for street lighting and public buildings is approximately 50 h.p., magnetite arc lamps being used for street lighting.

ST. JACQUES, Montcalm Co. (1,039*). Supplied by La Cie. Electrique des Laurentides. See under Laurentides.

ST. JEROME, Terrebonne Co. (4,734†). Supplied, under municipal control, from a hydro-electric plant on the North river, 4 miles distant. **Hydraulic Plant:** Concrete dam, 200 ft. long by 5 ft. high, whence an 8 x 8 ft. concrete conduit, 1,100 ft. long, leads to a concrete power house 30 x 20 ft.; available head, 20 ft. Equipment: two 270-h.p. turbines, each direct connected to a 150-k.v.a., 3-ph., 60-cy., 6,600-v. generator. Maximum load: full capacity of the plant; continuous service. Trouble from ice and leaves and shortage of water is sometimes experienced, although the storage basin is some 6 mi. in length. Installed in 1913, and valued at $150,000. **Transmission Line:** 4 mi. long, it consists of cedar poles supporting three No. 4 copper conductors on pin-type insulators. Energy transmitted to St. Jérôme at 6,600 v., 3 ph., 60 cy. Value of line, $10,000. **Substation:** Three 100-k.w. station transformers step the voltage down from 6,600 v. to 2,200 v. **Distribution:** 15 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 30 line transformers, of from 1 to 25 k.w. capacity. Consumers for lighting, 720, with a connected load of 250 k.w.; consumers for power, 10, with a connected load of 246 h.p. Distribution system, including the substation, valued at $50,000. **Rates:** Domestic, 2 to 12 cents per k.w.h., with a monthly minimum and meter rental, less 50 per cent discount. Flat power rate, $35 to $50 per h.p.-year. Power meter rate, from 5 to 14 cents per k.w.h., with a monthly minimum and meter rental, both power rates subject to 10 per cent discount. Street lighting: 60-c.p. to 400-c.p. incandescent lamps; proposed charges, from $15 per 60-c.p. to $40 per 400-c.p. lamp per year.

ST. JOHNS, St. Johns Co. (7,987*). Supplied by Southern Canada Power Co., 800 h.p. being purchased at the Chambly power house at 25,000 v., from the Montreal Light, Heat and Power Consolidated, the average rate being $22 per h.p.-year. An auxiliary steam plant is also connected with the system. **Transmission Line:** The line from Chambly to St. Johns is 12 mi. long and operates at 25,000 v., 3 ph., 62 cy., having a capacity of 1,000 k.w., with 5 per cent losses at a power factor of 80 per cent. It consists of a single circuit

of three No. 4 copper conductors, supported by pin-type insulators on wooden poles; lightning protection, horn-gap arresters at each end. The only substation on the line is at St. Johns, Iberville being also supplied from this. **Steam Plant and Substation:** Brick building 60 x 100 ft.; steam equipment; one water-tube boiler of 400 h.p. at 160 lbs. pressure and one return tubular of 200 h.p. at 100 lbs.; one 500-h.p. compound condensing engine and one 175-h.p. compound engine direct connected, respectively, to a 340-k.w. and a 115 k.w. generator at 3 ph., 60 cy., 2,200 v. Maximum load, 250 k.w., the plant being only used as an auxiliary to the purchased power. Fuel: bituminous coal; yearly consumption, 400 tons, at $9.40. First installed in 1880, but completely renewed in 1907. The substation equipment is in the same building, and comprises three 500-k.w. station transformers, stepping the voltage down from 25,000 v. to 2,200 v., 3 ph., 62 cy.; load divided, 42 per cent for lighting and 58 per cent for power. **Distribution:** including Iberville; covers 25 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 100 line transformers, of 1,000 k.w. total capacity. Number of consumers, 1,050; connected load, 800 k.w. for lighting, 900 h.p. in motors and 300 k.w. in appliances. **Rates:** Meter rate for lighting, 10 cents per k.w.h.; for appliances, 4 cents per k.w.h., both being subject to a discount of 25 per cent, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per annum, according to amount; meter rate for power, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. The power rates are subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc. Street lighting: 60-w. and 80-w. tungsten lamps, at, respectively, $12 and $15 per lamp, yearly.

ST. JOSEPH-DE-BEAUCE, Beauce Co. (1,440). Supplied by Beauce Electric Co., 150 h.p. at $28 per h.p.-year being obtained in block at Robertson at 15,000 v., from the St. Francis Water Power Co. See under Disraeli. From Robertson the energy is transmitted to the Beauce district, extending from Ste. Marie, Beauce, to St. George, Beauce, along the Quebec Central railway. **Transmission Line:** The line extends from Robertson to St. Joseph, whence it branches north to Ste. Marie and south to St. George, a total length of 45 miles. It operates at 15,000 v., 3 ph., 60 cy., and consists of a single circuit of three No. 4 copper conductors supported by pin-type insulators on wooden poles. The line supplies substations at Tring junction, Valley junction, Ste. Marie, St. Joseph, Beauceville and St. George. Total value of transmission line, substation equipment and distribution systems in the six villages mentioned, approximately $129,000. **Substation:** One 80-k.w., single-ph. station transformer, stepping the voltage down from 15,000 v. to 2,200 v. **Distribution** (local): 1½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 14 line transformers, of 100 k.w. total capacity. Number of consumers, 165; connected load, 54 k.w. for lighting and 40 h.p. in motors. **Rates:** Yearly flat rate for lighting, from $4.20 to $6 per 16-c.p. lamp and 15 cents per watt for high efficiency lamps; net meter rate, 11·25 cents per k.w.h., plus meter rental, with a yearly minimum of $1 per lamp; meter rate for power, from 1 to 2 cents per k.w.h., plus a monthly fixed charge of $1.50 per h.p.; flat rate for power, $30 per h.p.-year. Street lighting: 40-w. tungsten lamps, the yearly charge being at $5 per lamp yearly, without maintenance.

ST. JOSEPH-DE-ST. HYACINTHE, St. Hyacinthe Co. (608*). Supplied by Southern Canada Power Co. See under St. Hyacinthe.

ST. JOSEPH-DE-SOREL, Richelieu Co. (1,600*). Supplied by Sorel Light and Power Co., Ltd., the description of the entire system being comprised under Sorel.

ST. JOVITE, Terrebonne Co. (664†). Supplied by Mrs. Jos. Vauchesteing from a hydro-electric plant on Black creek. **Hydraulic Plant:** Timber dam, 100 ft. long by 25 ft. high, with a 3-ft. wooden flume 200 ft. long leading to a frame power house 50 x 24 ft.; available head, 40 ft. Equipment: one 80-h.p. turbine, belted to a 50-k.w., single-ph., 133-cy., 1,100-v. generator; maximum load, 35 k.w.; night service only; installed in 1911, and valued at

$5,000. **Distribution:** 2 mi. of streets; 6 line transformers, of from 4 k.w. to 7½ k.w. capacity. Number of consumers, 80; value of distribution system, $5,000. **Rates:** Flat rate, $6 per lamp per year.

STE. JULIENNE, Montcalm Co. (280†). Supplied by La Cie. Electrique des Laurentides. See under Laurentides.

ST. JUSTIN, Maskinonge Co. (1,498†). Supplied by La Cie. Electrique de Louiseville. See under Louiseville.

ST. LAMBERT, Chambly Co. (4,031†). Distributed under municipal control, being purchased in bulk from the L. E. Waterman Co. at $32 per h.p.-year. The energy is derived from a producer-gas and steam-power plant and also purchased in bulk by the Waterman Co. from the Montreal Light, Heat and Power Consolidated. **Distribution:** 11.2 mi. of distribution circuits; primaries at 2,200 v., house lighting at 110 v., and power service at 110 v. and 550 v.; 41 line transformers, of from 2½ k.w. to 10 k.w. capacity. Maximum load, 208 h.p., the system supplying 660 consumers with a connected load of 425 h.p. for lighting and 80 h.p. for motors. Value of distribution system, $50,110. **Rates:** Meter rate for house lighting, 5 cents per k.w.h.; for heating and cooking, 2 cents per k.w.h. The flat rate for power is $30 per h.p.-year. Street lighting: 40-w. tungsten lamps, at $14 each per year; also nitrogen lamps, up to 250-w. capacity, at $38.50 per h.p.-year.

STE. MADELEINE, St. Hyacinthe Co. (390†). Supplied by Southern Canada Power Co., a block of 30 k.w. being taken from the transmission line supplying St. Hyacinthe from the Chambly plant of the Montreal Light, Heat and Power Consolidated. **Substation:** Two 50-k.w. station transformers, stepping the voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** 1 mi. of streets; primaries at 2,200 v., and secondaries at 110 v.; 8 line transformers, of 55 k.w. total capacity. Number of consumers, 22; connected load, 22 k.w. for lighting, 25 h.p. in motors, and 8 k.w. in appliances. Distribution system valued at $8,000, including station transformers. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 25 per cent, with a monthly minimum; flat rate for power, from $70 to $130 per k.w. per annum, according to amount; meter rate for power, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. The power rates are subject to discounts up to 70 per cent, according to restriction in use, with additional discounts for duration of contract, prompt payment, etc.

ST. MARC, Portneuf Co. (222†). Supplied by North Shore Power Co. See under St. Casimir. Also supplied by La Cie. Hydraulique de Portneuf. See under Deschambault.

STE. MARIE, BEAUCE, Beauce Co. (1,415*). Supplied by Beauce Electric Co. See under St. Joseph, Beauce. **Substation:** Two 25-k.w., single-ph. station transformers, stepping voltage down from 15,000 v. to 2,200 v. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 11 line transformers, of 50 k.w. total capacity. Number of consumers, 114; connected load, 36 k.w. for lighting and 5 h.p. in motors. **Rates:** Yearly flat rate for lighting, from $4.20 to $6 per 16-c.p. and 15 cents per watt for high efficiency lamps; net meter rate, 11·25 cents per k.w.h., plus meter rental, with a yearly minimum of $1 per lamp; meter rate for power, from 1 to 2 cents per k.w.h., plus a monthly fixed charge of $1.50 per h.p.; flat rate for power, $30 per h.p.-year. Street lighting: 40-w. tungsten lamps, at $9.50 per lamp, yearly.

ST. MATHIAS, Rouville Co. (699†). Supplied by Southern Canada Power Co., being purchased from the Montreal Light, Heat and Power Consolidated, and supplied directly from the Chambly plant. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 30 k.w. total capacity. Number of consumers, 30; connected load, 2 k.w. for lighting. **Rates:** For lighting, 10 cents per k.w.h., less 25 per cent

discount, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per annum, according to amount, while the meter rate is from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w., the power rates being all subject to discounts up to 70 per cent, according to restrictions in use, with additional discounts for special conditions and 10 per cent for prompt payment.

ST. MAURICE, Champlain Co. (175†). Supplied by North Shore Power Co. See under St. Narcisse.

ST. NARCISSE, Champlain Co. Supplied by North Shore Power Co., mainly from the local hydro-electric plant described under Three Rivers. The district supplied also includes St. Maurice, Ste. Geneviève, Champlain and St. Stanislas. Total power supplied, 190 k.w., 21 per cent being for lighting and 79 per cent for power. **Substations:** One at St. Maurice of 20 k.w., one at St. Geneviève of 60 k.w., and one at Champlain of 100 k.w. capacity. **Distribution:** Including various systems, 27 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 30 line transformers, of 150 k.w. total capacity. Number of consumers, 400; connected load, 80 k.w. for lighting and 200 h.p. in motors. **Rates:** Meter rate for lighting, 4 to 10 cents per k.w.h., less 10 per cent discount. Street lighting: 60-w. and 16-c.p. lamps, at $10 per 60-w. lamp yearly.

ST. OURS, Richelieu Co. (622). Supplied by Sorel Light and Power Co. See under Sorel.

ST. PAUL-L'ERMITE, L'Assomption Co. (800†). Supplied by the Laval Electric Co. See under Ste. Thérèse.

ST. PAULIN, Maskinonge Co. Supplied by La Cie. d'Eclairage de Yamachiche. See under Yamachiche.

ST. PHILIPPE, Argenteuil Co. (199†). Supplied by Ayers, Limited. See under Lachute.

ST. PIE, Bagot Co. (768). Supplied by Nap. Bélanger, from a water-power plant on the Yamaska river in the village. The plant is also used for milling purposes. **Water-power Plant:** Concrete dam, 450 ft. long by 4 ft. high, with an open canal 20 ft. long, 9 ft. wide, and 12 ft. deep, leading to the mill, where the equipment comprises a 75-h.p. turbine, belted to a 62-k.v.a., 3-ph., 60-cy., 2,300-v. generator, the latter being installed in a concrete building 15 ft. square. Maximum load, 30 h.p.; night service only. Trouble is sometimes experienced from frazil ice in winter, to overcome which a steam auxiliary plant is being installed. Plant in operation since 1915, and the electric portion, including distribution system, is valued at $5,000. **Distribution:** 4 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 4 line transformers, of 25 k.w. total capacity. Number of consumers, 66; connected load, 25 k.w. for lighting and 8 k.w. in heating appliances. **Rates:** Meter rate, 13 cents per k.w.h., with a monthly minimum; flat rate, from 20 to 42 cents per 40-w. lamp per month. Street lighting: 40-w. lamps, at $10 per lamp yearly.

ST. RAYMOND, Portneuf Co. (1,687†). Supplied, under municipal control, from a hydro-electric plant on the Ste. Anne river, in the village. **Hydro-electric Plant:** Wooden dam, 8 ft. high by 200 ft. long, with an excavated head-race of 6 x 12 ft. section and 600 ft. long, leading to a concrete power house 12 x 12 ft.; available head, 15 ft. Equipment: one 100-h.p. turbine, direct connected to a 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 100 h.p. The plant, which gives a continuous service, was installed in 1914, and, including the distribution, is valued at $38,000. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 25 line transformers, of from 1 k.w. to 10 k.w. capacity Number of consumers, 250; connected power load alone, 40 h.p. in motors. **Rates:** Meter rate, 10 cents per k.w.h.; monthly flat rate, from 20 to 40 cents per lamp, according to number. Street lighting: 60-w. lamps.

ST. REMI, Napierville Co. (1,021). Supplied by Wm. Clark Co., from a steam plant connected with their factory. **Power Plant:** Two 75-h.p. return tubular boilers, and two engines, of 50 h.p. and 100 h.p., respectively (also used for factory), belted through a countershaft to a 30-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: bituminous coal. Maximum load, 40 h.p.; continuous service. **Distribution:** 2½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 16 line transformers, of 82¼ k.w. total capacity. Number of consumers, 142; connected load, 85 k.w. for lighting and 42 h.p. in motors. Street lighting: 50-w. tungsten lamps, at $15 per lamp yearly.

ST. ROCH, Richelieu Co. (804†). Supplied by Sorel Light and Power Co. See under Sorel.

ST. ROCH-DE-L'ACHIGAN, L'Assomption Co. (1,775†). Supplied by E. Leclerc, from a hydro-electric plant on Achigan river in the village. **Hydraulic Plant:** Concrete dam 80 ft. long by 5 ft. high, with a frame power house 25 x 25 ft.; 14-ft. head afforded. Equipment: one 90-h.p. turbine, belted to two generators of 30 k.w. and 60 k.w., respectively, both operating at 60 cy., single-ph., 2,200-v. Maximum load, 22 k.w.; night service only. The plant, which is in operation since 1903, is valued at $2,000. **Distribution:** 11 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 11 line transformers, of from 1½ k.w. to 4 k.w. capacity. Number of consumers, 117; value of distribution system, $10,000. **Rates:** Flat rate, 40 cents per 16-c.p. lamp per month.

STE. ROSALIE, Bagot Co. (1,175†). Supplied by Southern Canada Power Co. See under St. Hyacinthe.

STE. ROSE, Laval Co. (2,116*). Supplied by Laval Electric Co. See under Ste. Thérèse.

STE. SCHOLASTIQUE, Two Mountains Co. (656†). Supplied by J. U. Foucher & Co., from a hydro-electric plant on North river, at St. Canute, the latter village also being supplied. **Hydro-Electric Plant:** Concrete dam 30 ft. high by 150 ft. long, with a 4-ft. wood-stave pipe 450 ft. long leading to a frame power house 60 x 40 ft.; available head, 50 ft. Equipment: one 100-h.p. turbine, belted to a 60-k.w., 3-ph., 60-cy. ,2,300-v. generator. Maximum load, 40 k.w.; night service only. Slight trouble is sometimes experienced during September and February from shortage of water. Plant in operation since 1899, but present one installed in 1915; value, $35,000, including distribution systems and supply line. **Distribution:** Including the two systems and the supply line from the power plant, 10 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 12 line transformers, of 30 k.w. total capacity. Number of consumers, 300; connected load, 150 k.w. for lighting and 25 h.p. for power. **Rates:** Flat rate, 45 cents per 60-c.p. lamp monthly. Street lighting: 60-w. tungsten lamps, at 45 cents monthly.

ST. SEVERE, St. Maurice Co. (875†). Supplied by La Cie. d'Eclairage de Yamachiche. See under Yamachiche.

ST. STANISLAS, Champlain Co. (1,072†). Supplied by the North Shore Power Co. See under St. Narcisse.

STE. THERESE, Terrebonne Co. (2,600†). Supplied by Laval Electric Co., which also supplies the places described hereunder, from a system of transmission lines at 20,000 v. About 600 h.p. is obtained from the Shawinigan Water and Power Co., through a main substation at Charlemagne, where the voltage is reduced from 50,000 v. to 20,000 v., 3 ph., 30 cy. **Transmission Lines:** The system covers the north shore of the St. Lawrence river, north of the island of Montreal, and extends from L'Assomption to St. Eustache. There is altogether, 48 mi. of 20,000-v. lines, operating at 3 ph., 30 cy., and consisting mainly of a single circuit of three No. 2 copper conductors, supported by pin-type insulators on wooden

poles. Lightning protection: concrete resistance type arresters. The following are the substations supplied, with the capacity of each: L'Epiphanie and L'Assomption, 150 k.w.; St. Paul-l'Ermite, 30 k.w.; Charlemagne, 150 k.w.; Terrebonne, 150 k.w.; Mascouche, 30 k.w.; St. François-de-Sales, 150 k.w.; Ste. Rose, 90 k.w.; Ste. Thérèse, 150 k.w.; St. Eustache, 40 k.w. Repentigny, Lachenaie and two stone quarries are also supplied. **Distribution:** The distribution systems at the above places cover a total of 50 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 23 line transformers, of 760 k.w. total capacity. Number of consumers, 1,300; connected power load alone, 2,355 h.p. in motors. **Rates:** Meter rate for lighting from 10 to 3 cents per k.w.h., and for cooking from 4 to 1·5 cents per k.w.h.; flat rate for power, from $24 to $40 per h.p.-year Street lighting: 60-w. and 16-c.p. lamps at, respectively, $12.50 and $10 per lamp yearly.

ST. TITE, Champlain Co. (1,782*). Supplied by A. Lambert, of Grandes-Piles, from a hydro-electric plant on Envies river at Proulxville; the latter village is also supplied. **Hydro-electric Plant:** Concrete dam, 6 ft. high by 150 ft. long, with a wooden flume of 3½ ft. by 3 ft. section, 160 ft. long, leading to a brick and frame power house 40 x 20 ft.; available head, 22 ft. Equipment: one 70-h.p. turbine, belted to a 150-k w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 35 h.p.; night service only. Plant installed in 1907, and valued at $15,000, including distribution system. **Distribution:** Including the supply line and Proulxville, 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v ; 16 line transformers, of from 2½ k.w. to 10 k.w. capacity. Number of consumers, 300, all for lighting and small appliances. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting in St. Tite, none; in Proulxville, 40-w. tungsten lamps, at $6 per lamp yearly.

ST. ULRIC, Matane Co. (1,655*). Supplied by La Cie. Roy, from a hydro-electric plant on Blanche river, in the village. **Power Plant:** Stone-filled crib dam, 80 ft. long by 4½ ft. high, with a 3-ft. wood-stave penstock 460 ft. long leading to a frame and brick power house 40 x 24 ft.; available head, 23 ft. Equipment: one 45-h.p. turbine belted to a 30-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 30 h.p.; night service only Plant installed in 1909. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 2 line transformers, of 15 k.w. capacity each. Number of consumers, 40; connected load, 25 k.w. for lighting. **Rates:** Flat rate, 1 cent per night per 25-w. lamp; meter rate, 6 cents per k.w.h., with a monthly minimum of $1 and a meter rental. Street lighting: 25-w. lamps, this service being supplied in return for the franchise.

STE. URSULE, Maskinonge Co. Supplied by La Cie. Electrique de Louiseville. See under Louiseville.

ST. VINCENT-DE-PAUL, Laval Co. (1,492) Supplied from the penitentiary, being generated by steam. **Steam Plant:** Building, 95 x 57 ft.; contains three water-tube boilers of 350 h.p. total capacity at 100 lbs. pressure; a 50-h.p. and a 105-h.p. engine, direct connected, respectively, to a 22-k.w. and a 56-k.w., 115-v., d.c. generator, with a 45-k.w. motor-generator set, the generator being at 500 v., d.c. Plant is also used in connection with the institution; maximum load, 50 k.w.; continuous service. Fuel; run-of-mine coal, at $9 per ton. Plant installed in 1901. **Distribution:** 1 mi. of streets, 2,000 ft. being underground; energy is distributed at 115 v. and 500 v., d.c., supplying 30 consumers. **Rates:** Meter rate, 7·5 cents per k.w.h.; monthly flat rate, 15·33 cents per 10 c.p. Street lighting: 15-w. tungsten lamps, for which there is no charge.

SACRE-COEUR, Rimouski Co. (996). Supplied by the Crédit Municipal Canadien. See under Rimouski.

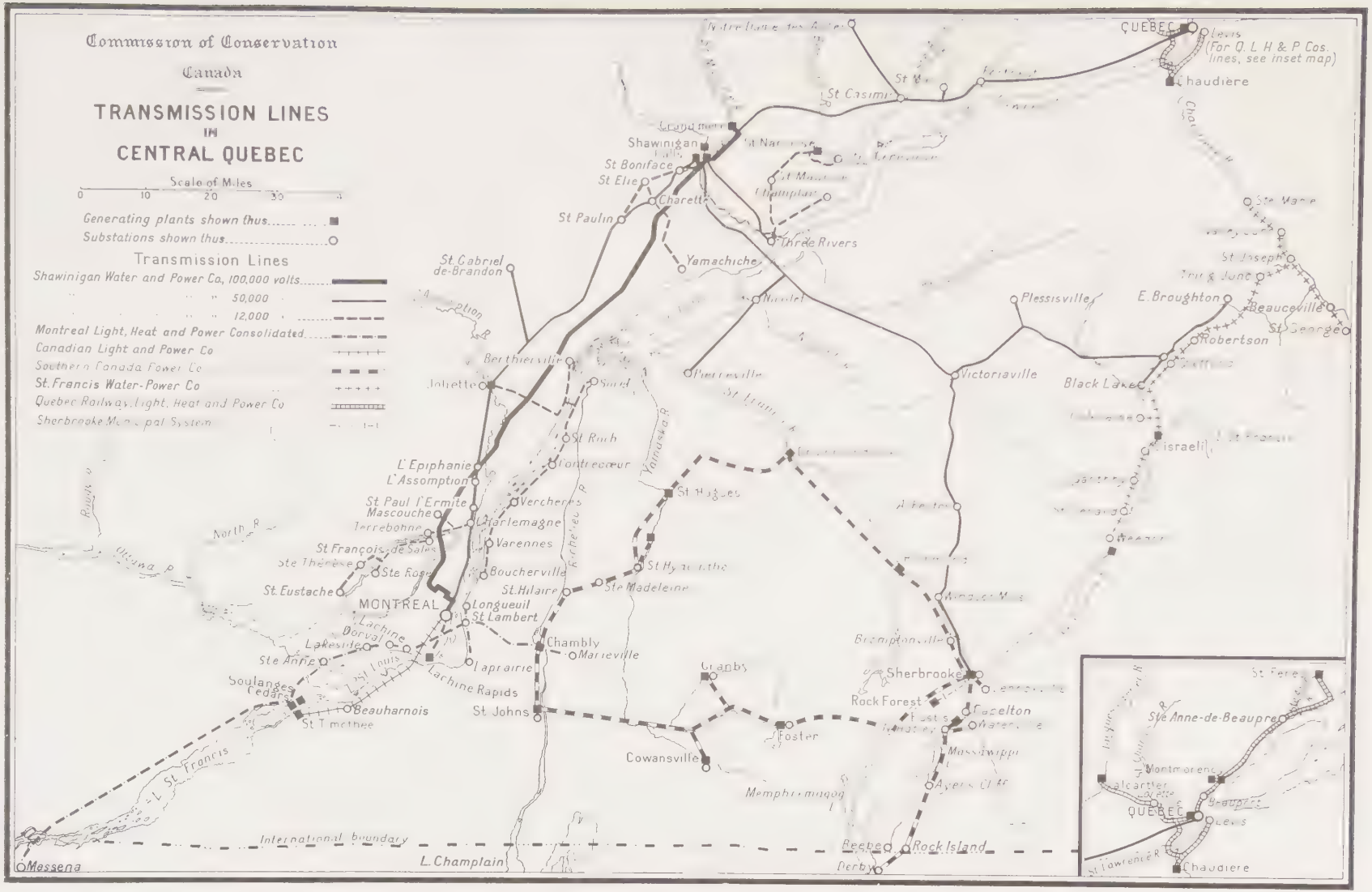
SAWYERVILLE, Compton Co. (432). Supplied by A. G. Hurd, from a local hydro-electric plant, on the south branch of Eaton river. **Hydro-electric Plant:** Wooden dam, 15 ft. high by 130 ft. long, including a concrete bulkhead, whence a 4-ft. wood-stave pipe, 50 ft.

long, leads to a frame power house 30 x 80 ft., where a head of 18 ft. is available. Equipment: one 85-h.p. turbine, belted to a 30-k.w., single-ph., 125-cy, 2,200-v. generator. Maximum load; 15 k.w; night service only. Plant installed in 1908, and, including the system of distribution, valued at $9,000. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 5 line transformers, of 25 k.w. total capacity Number of consumers, 75; connected load, 37 k.w. for lighting and 8 k.w. in appliances. **Rates:** Meter rate for lighting, 10 cents per k.w.h. Street lighting: 40-w. and 60-w. tungsten lamps, at $5 per 50 watts yearly, exclusive of renewals.

SAYABEC, Matane Co. (120*). Supplied by La Compagnie Electrique d'Amqui. See under Amqui.

SCOTSTOWN, Compton Co. (933). Supplied by Scotstown Electric Light Co., from a local hydro-electric plant on the Salmon river. **Hydro-electric Plant:** Stone-filled crib dam, 80 ft. long by 15 ft. high, with a 4-ft. iron conduit, 720 ft. long, leading to a frame power house 24 x 24 ft.; available head, 22 ft. Equipment: one 203-h.p. turbine, belted to a 75-k.w., 3-ph. 60-cy., 2,200-v. generator. Maximum load, 90 h.p.; night service regularly and day service once a week; installed in 1913, and valued at $12,000, including distribution system. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 8 line transformers, of 40 k.w. total capacity. Number of consumers, 100; connected load, 50 k.w. for lighting, 15 h.p. in motors, and 10 k.w. in appliances. **Rates:** Flat rate, 1 cent per 40-w. lamp per night. Street lighting: 60-w. tungsten lamps, at 2 cents per lamp per night.

SHAWINIGAN FALLS, St. Maurice Co. (8,000*). The Shawinigan Water and Power Co. owns and operates the largest hydro-electric development and the most extensive system of long distance transmission lines in the province of Quebec and ranks among the most important in the Dominion. Electric energy is derived from the Shawinigan fall, on the St. Maurice river, the entire water rights at this site being owned by the Shawinigan Water and Power Co., which sells portions of the water to two local enterprises. One uses 30,000 h.p. to produce direct current electric energy for the production of aluminium and the other uses 15,000 h.p. for the manufacture of wood pulp and paper. The greater portion of the water, however, is used to operate the company's two hydro-electric plants, which have a total capacity of 155,000 h.p.; this gives an aggregate water-power development of 200,000 h.p. One-half of this, or some 100,000 h.p., is used in local industries, either by the direct use of water-power or by electric energy generated at the company's plant. The Shawinigan company also obtains an additional 50,000 h.p., at 50,000 v. and 100,000 v., from the Laurentide Power Co's hydro-electric plant at Grand'mère. See under Grand'mère. The transmission system supplied from Shawinigan extends from Montreal to Quebec and, in the Eastern Townships, to the Thetford asbestos district, Sherbrooke and Windsor Mills, or over 750 mi. of electric transmission lines. **Hydraulic Development:** By the conservation storage works at La Loutre, undertaken by the Quebec government, and now approaching completion, the flow in the St. Maurice river will be greatly benefited. This work involved the construction of an 80-ft. concrete dam, affording a reservoir of 160,000 million cubic feet capacity, which it is estimated will double the previous minimum flow in the river. The hydraulic works at Shawinigan Falls include a moveable steel dam 850 ft. long at the head of the fall, with gates operating between concrete piers placed 40 ft. apart, the dam being in two sections on each side of an island. From the head-water a canal, excavated in the rock, 100 ft. wide, 30 ft. deep and 1,000 ft. long, terminates in a concrete bulkhead 300 ft. long and 35 ft. high, built in two sections adjoining each other, whence the penstocks lead to the various power houses below, one section providing for No. 1 power house and the generating stations of the aluminium works, while the other provides for No. 2 power house. Each section of the bulkhead has an appropriate gate house controlling the flow of water at the head of the penstocks. The available head of 145 ft. is the same at both power houses. **No. 1 Power House:** Concrete


Commission of Conservation
Canada
TRANSMISSION LINES
IN
CENTRAL QUEBEC
Scale of Miles
0 10 20 30
Generating plants shown thus
Substations shown thus
Transmission Lines
Shawinigan Water and Power Co, 100,000 volts
" " 50,000 "
" " 12,000 "
Montreal Light, Heat and Power Consolidated
Canadian Light and Power Co
Southern Canada Power Co
St. Francis Water-Power Co
Quebec Railway, Light, Heat and Power Co
Sherbrooke Municipal System
QUEBEC
Lévis
(For Q. L. H. & P. Cos. lines, see inset map)
Chaudière
St Casimir
Shawinigan
St Boniface
St Elie
Charette
St Paulin
Three Rivers
Yamachiche
St Gabriel de-Brandon
Berthierville
Joliette
St Roch
Montreal
Plessisville
E. Broughton
Beauceville
St Georges
Robertson
Victoriaville
Black Lake
Israeli
L'Epiphanie
L'Assomption
St Paul l'Ermite
Mascouche
Terrebonne
St François-de-Sales
Ste Thérèse
Ste Rose
St Eustache
Vercheres
Charlemagne
Varennes
Bouchervilla
St Hilaire
Ste Madeleine
St Hyacinthe
MONTREAL
Longueuil
St Lambert
Lachine
Dorval
Lakeside
Ste Anne
Soulanges
Cedars
Beauharnois
St Timothee
Laprairie
Lachine Rapids
Chambly
Marieville
St Johns
Granby
Sherbrooke
Rock Forest
Lacelton
Foster
Cowansville
Massawippi
Ayers Cliff
Memphremagog
Beebee
Rock Island
Derby
Messena
L. Champlain
International boundary
Ste Anne-de-Beaupre
Montmorency
Beauport
Lévis
QUEBEC
Chaudière

and brick building 75 x 275 ft., the water being led from the bulkhead through four 9-ft. and two 12-ft. steel penstocks 550 ft. long, each supplying one of the six main units, while another small pipe serves two exciter units. Equipment: three 9,000-h.p. turbines, each direct connected to two generators of 3,750 k.w. and 2,000 k.w. capacity, respectively, also three 10,500-h.p. turbines, two of which are each direct connected to a 6,600-k.w. generator and the third to a 8,000-k.w. generator, all of the electric energy being generated at 2 ph., 30 cy., 2,200 v.; three independently-driven exciter units, each of 300 h.p. to 400 h.p. capacity. Station transformers: 20 single-ph. units, having an aggregate capacity of 40,000 k.w., stepping the voltage up from 2,200 v., 2 ph., to both 50,000 v. and 25,000 v., 3 ph., 30 cy.; the 25,000-v. energy is to supply some 20,000 k.w. to the local carbide works. This power house was first placed in operation in 1902. **No. 2 Power House:** From another section of the bulkhead five 14-ft. steel penstocks, 600 ft. long, lead to the No. 2 power house, a concrete and brick building 115 x 260 ft. Equipment: five 18,000-h.p. units, each consisting of a twin spiral case turbine, coupled directly to a 15,000-k.v.a., 3-ph , 6,600-v. generator; four generators are of 60 cy. and one of 30 cy., also three exciter units of 400 k.w. capacity, two driven directly from independent turbines, and one by a 3-ph. motor, the current from the motor being supplied from the main units. There are five station transformers, each a 3-ph. unit of 15,000 k.w., connected independently to one of the generators, and stepping the voltage up from 6,600 v. to 100,000 v. for the 60-cy. generators, and to 50,000 v. in case of the 30-cy. generator. The installation dates from 1912. No. 1 and No. 2 power houses are tied together electrically. The two plants carry a maximum load of about 90,000 k.w., with a load factor of 50 per cent. **Transmission Lines:** Independent lines are supplied from each of the two power houses, those from No. 1 being at 50,000 v. and those from No. 2 at 50,000 v. and 100,000 v. The entire transmission system may be better understood by referring to the maps opposite page 76. The 100,000-v. lines, shown by heavy continuous lines, extend to Montreal, 87 miles, in one direction, and to Grand'mère, 7 miles, in the other. They are erected on a private right-of-way, 100 ft. wide; the steel towers are placed 520 ft. apart, each line consisting of two circuits of three aluminium cables, arranged in a vertical plane on each side of the tower, to which they are supported by suspension insulators. Each of the two circuits of the Montreal line has a normal capacity of 15,000 k.w., with 10 per cent loss, and each circuit of the Grand'mère line has a capacity of 40,000 k.w., with 6 per cent loss. Lightning protection : electrolytic arresters at each end of the lines and a grounded wire over each circuit along the lines. The 50,000-v. lines, shown on the map by lighter continuous lines, have a total length of about 550 mi., extending in three directions, first to Montreal, second to Quebec, and third to Three Rivers and across the St. Lawrence river to Victoriaville and the asbestos mining district, with another branch from Victoriaville to Windsor Mills and Sherbrooke. The crossing of the St. Lawrence near Three Rivers is effected at 50,000 v. by means of an overhead span 5,000 ft. in length; the two supporting steel towers are 350 ft. high, allowing a minimum clearance of 160 ft. above water level for the three plough-steel conductors placed 50 ft. apart in the same plane. Three types of line construction are used for the various voltages. The first consists of a wood-pole line spaced 100 ft. to 150 ft., with three conductors arranged in an equilateral triangle and supported on pin-type insulators. This type of construction is estimated to cost $1,500 per mi., and is used for the line to Montreal and to the south shore of the St. Lawrence. The second type consists of latticed steel poles, in concrete foundations, spaced 300 ft., with three steel cross-arms and pin-type insulators supporting two circuits, and with one ground wire at the top of the pole, the estimated cost being $3,500 per mile. The third type is the steel tower construction, with concrete foundations, and suspension type insulators arranged for two circuits of 100,000 v. The estimated cost for this type is $7,500 per mi. The first two types are used for voltages up to and including 60,000 v., the third type for voltage of 100,000 v., while the various costs given are based on using aluminium conductors of between 150,000 c.m. and 250,000 c.m., with prevalent prices at time of construction, and they do not include cost of right-of-way. The transmission system supplies the following substations, the voltage at which energy is received, the capacity, and amount of power taken being also given:

	Receiving voltage	Transformer capacity	Amount of power taken, k.w.
Montreal, station No. 1	44,000	15,000 k.w.	40,000
" " 2	100,000	50,000 "	
Charlemagne	46,000	750 "	300
St. Norbert	50,000	200 "	50
Three Rivers	50,000	7,000 "	5,500
Victoriaville	50,000	300 "	200
Thetford	44,000	6,000 "	5,000
Asbestos	44,000	3,000 "	2,000
Black Lake	42,000	1,500 "	1,000
East Broughton	42,000	600 "	400
Windsor Mills	42,000	600 "	500
Plessisville	45,000	300 "	60
Pierreville	50,000	100 "	10
Sherbrooke	44,000	6,000 "	1,350
St. Casimir	50,000	300 "	300
Portneuf	50,000	200 "	100
St. Marc	25,000	200 "	100
Quebec	50,000	3,000 "	1,200

The Shawinigan Water and Power Co. furnishes power for distribution to the following organizations: Montreal Light, Heat and Power Consolidated, Montreal; Public Service Corporation, Quebec; Southern Canada Power Co., Sherbrooke; North Shore Power Co., Three Rivers; St. Maurice Light and Power Co., Shawinigan Falls; Laval Electric Co., Charlemagne; La Cie. d'Eclairage de Yamachiche, Yamachiche; Thetford Mines Electric Co., Thetford; Nicolet Electric Co., Nicolet; Sorel Electric Co., Sorel; Plessis Electric Co., Plessisville; Arthabaska Water and Power Co., Victoriaville; corporations of Joliette, Terrebonne, and St. Gabriel-de-Brandon.

Local Distribution—Supplied by St. Maurice Light and Power Co., being obtained both from the large power plants of the Shawinigan Water and Power Co. and a smaller hydro-electric plant on the Shawinigan river near the town. **Hydro-electric Plant:** Crib-work dam, 100 ft. long by 25 ft. high, with a 3-ft. wood-stave penstock, 500 ft. long, leading to a brick power house 40 x 30 ft.; available head, 90 ft. Equipment: one 300-h.p. turbine, direct connected to a 200-k.w., 3-ph., 60-cy., 2,200-v. generator, the maximum load being the full capacity of the plant. It was installed in 1901 and gives a continuous service. The system also takes a block of 500 h.p. from the Shawinigan Co. directly from the large power plants. Total energy may be divided into 50 per cent for lighting and 50 per cent for power. **Distribution:** Including Baie-de-Shawinigan and Almaville, 14 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 50 line transformers, of 800 k.w total capacity. Number of consumers, 3,000; connected load, 1,500 k.w. for lighting, 375 h.p. in motors and 400 k.w. in appliances. **Rates:** Meter rate for lighting, 5 cents per k.w.h., with a monthly minimum; monthly flat rate, 30 cents per 100-w. lamp; rate for power, from 0·4 cent to 1·75 cents per k.w.h., plus a monthly fixed charge of from 75 cents to $1 per h.p., according to capacity. Street lighting: 100-w. tungsten lamps, at $8.40 per lamp yearly.

SHAWVILLE, Pontiac Co. (715). Supplied under municipal control, from a gasolene-engine plant. **Power Plant:** Frame building 20 x 34 ft., containing two 9-h.p. gasolene engines, each direct connected to a 6-k.w., 60-v., d.c. generator and a 1,680-amp.-hr. storage battery. Daily gasolene consumption, 13 gallons, at 35 cents per gallon. Maximum load, 9 k.w.; the plant, which was installed in 1912, and is valued at $7,000, gives a continuous service with help of battery. **Distribution:** 1½ mi. of streets, the distribution being at 60 v., d.c. Number of consumers, 90; connected load, 12 k.w. for lighting. **Rates:** The meter rate is 25 cents per k.w.h. Street lighting: 100-w. lamps, for which there is no special charge.

SHERBROOKE, Sherbrooke Co. (23,210†). Distributed in Sherbrooke under municipal control and also, for power purposes, by the Southern Canada Power Co.

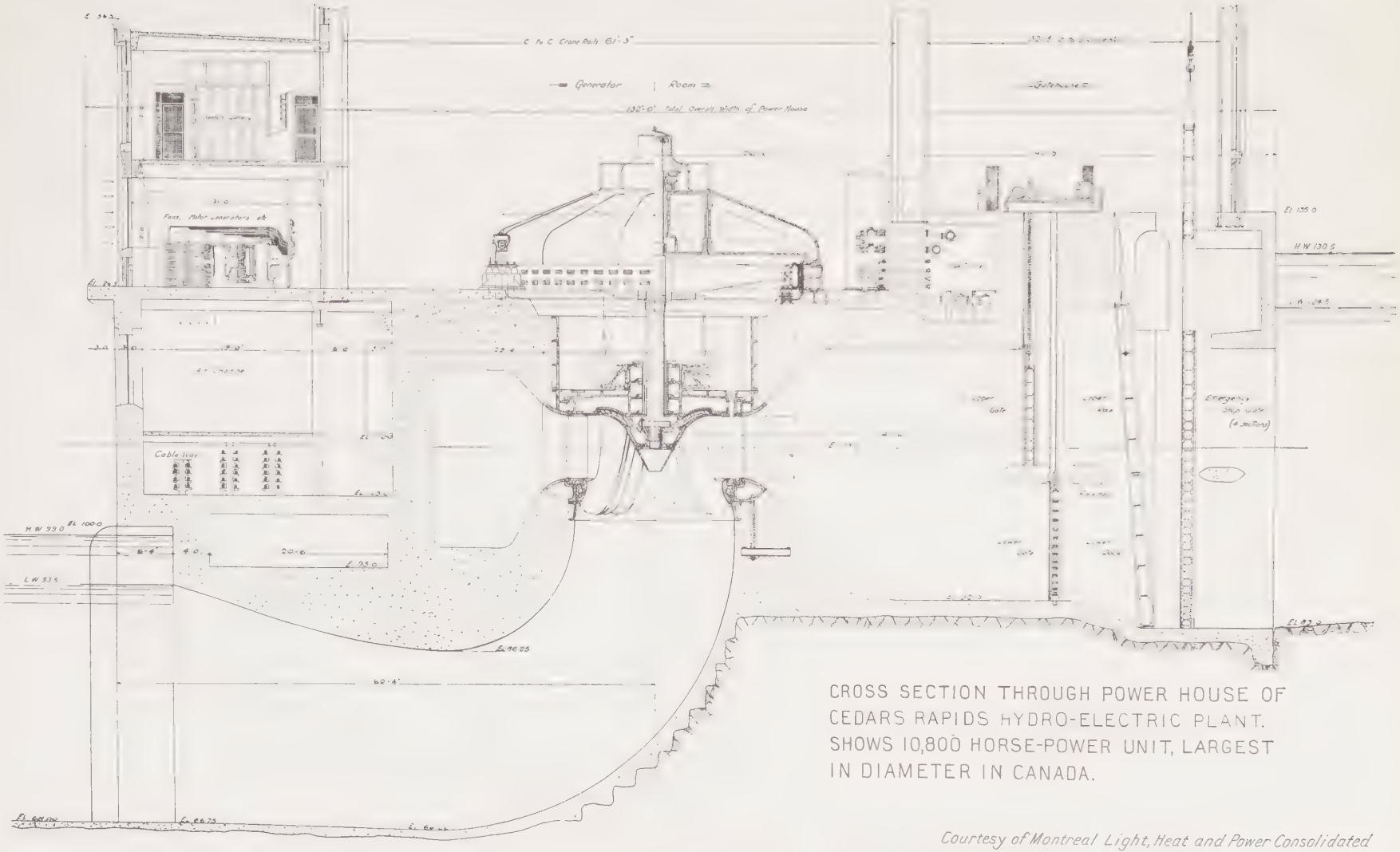
Municipal System—The municipal system is supplied from three power plants, one in the city on the Magog river, one at Rock Forest, and the other at Weedon. **Rock Forest Hydro-electric Plant:** On the Magog river, 7 miles above the city. Development: concrete dam, 200 ft. long by 40 ft. high, with brick power house 50 x 30 ft. adjacent. Head utilized, 32 ft. Equipment: two 1,450-h.p. turbines, each direct connected to a 1,250-k.v.a., 3-ph., 60-cy., 6,600-v. generator. Three 750-k.v.a. station transformers step the voltage up from 6,600 v. to 13,200 v., 3 ph. Plant installed in 1911; value, $150,000. **Weedon Hydro-electric Plant:** On the St. Francis river at Weedon, 30 mi. north-east of Sherbrooke. Development: stone-filled crib dam, 225 ft. long by 30 ft. high, with concrete wing walls 20 ft. high, extending an additional 200 ft.; concrete and brick power house, 40 x 40 ft., adjacent. Head utilized, 30 ft. Equipment: one 1,250-h.p. turbine, direct connected to a 750-k.v.a., 2,200-v., 3-ph., 60-cy. generator; provision is also made for the installation of an additional unit of 2,500 h.p. There is one 3-ph. station transformer of 2,200 k.v.a. capacity, stepping the voltage up from 2,200 v. to 45,000 v. The plant is valued at $375,000 and its full load is transmitted to Sherbrooke. Installed 1916. **Transmission Line from Rock Forest:** This line to Sherbrooke is 7½ mi. long and operates at 13,200 v., 3 ph., 60 cy. It consists of two circuits of three No. 0 copper conductors, supported by pin-type insulators on the same wooden-pole line, the two circuits having a capacity of 4,000 k.v.a., with a loss of 14 per cent. Lightning protection, electrolytic arresters at each end. The line and station transformers pertaining to it are valued at $41,000. **Transmission Line from Weedon:** This line to Sherbrooke is 30 mi. long and operates at 45,000 v., 3 ph., 60 cy. It consists of one circuit of three No. 4 copper conductors, supported by pin-type insulators on wooden poles; capacity, 4,500 k.v.a., with a loss of 13 per cent. Lightning protection, electrolytic arresters at each end. Its cost is estimated at $70,000. **City (Frontenac) Hydro-electric Plant:** This development on the Magog river includes a concrete dam, 250 ft. long by 50 ft. high, with two 15-ft. reinforced concrete flumes, 35 ft. long, leading to a brick and concrete power house 80 x 80 ft.; available head, 39 ft. Equipment: three 1,800-h.p. turbines, each direct connected to a 1,000-k.v.a., 2,200-v., 3-ph., 60-cy. generator. The building is also used as a substation for the energy coming from the other two power plants, the combined maximum load being 4,000 h.p. The cost of power is approximately $25 per horse-power per year. This plant, which was installed in 1887, was partly renewed recently, and is valued at $242,000. **Substation:** Equipment: three 750-k.v.a transformers, stepping the voltage down from 13,200 v. to 2,200 v. for energy coming from Rock Forest, and a 2,200-k.v.a., 3-ph. unit stepping the voltage down from 45,000 v. to 2,200 v., 3 ph., 60 cy., for the energy from the Weedon plant. **Distribution:** 32 mi. of streets; primaries at 2,200 v. and secondaries at from 110 v. to 550 v.; 300 line transformers, of from 3 k.w. to 350 k.w. capacity. Number of consumers, 4,400; connected load 3,000 k.w. for lighting and 8,000 h.p. in motors. **Rates:** Meter rate for lighting, 6 cents per k.w.h., less a 10 per cent discount; for heating appliances, 2 cents per k.w.h., being subject to a minimum charge; flat rate for window lighting, $1.50 per 50 w. per year; meter rate for power, 0·75 cent per k.w.h., with a minimum of from 40 cents to $1 per horse-power per month. Street lighting: nitro lamps, 1,545 of 100-c.p. and 28 of 750-w., the total charge being $10,000 yearly. The system is valued at $183,245.

Southern Canada Power Co.—The Southern Canada Power Co. distributes electric energy in Sherbrooke from a hydro-electric plant on the Magog river in the city, while a block of some 1,000 h.p., transmitted from Shawinigan at 48,000 v., is purchased from the Continental Light and Heat Co.; energy is also transmitted from the Sherbrooke substation and distributed in the district north of Sherbrooke to Bromptonville and south to Rock Island, Que., and Derby Centre, Vt., while a transmission line for the Foster and Granby district is nearly completed. **Hydraulic Plant:** Concrete dam 72 ft. long by 44 ft. high, with a steel penstock 600 ft. long leading to a brick power house on concrete foundation 160 x 38 ft. Equipment: three 1,350-h.p. turbines, operating under a head of 58 ft., each direct connected to a 950-k.w., 3-ph., 60-cy., 2,300-v. generator, and two independently driven 50-k.w. exciter units. Maximum load, 2,300 k.w., with an average load factor of 60 per cent, the

service being continuous. The minimum flow of the river, approximately 500 cubic feet per second, represents 2,600 h.p.; 500 h.p. is converted to direct current at 600 v., by a motor-generator set, and used for electric railway purposes, the remainder of the energy being transmitted and distributed for light and power purposes. The plant was installed in 1907, and is valued at $200,000. Station transformer equipment: two 1,000-k.v.a. units for the purchased power, stepping the voltage down from 48,000 v. to 2,300 v., 3 ph., 30 cy., with frequency changers converting to 60 cy., while three 500-k.v.a. units for the outgoing energy step the voltage up from 2,300 v. to 22,000 v., 3 ph., 60 cy. The yearly load factor on the whole plant is 70 per cent. **Transmission Lines**: There are three transmission lines from this station; one, extending to the Granby and Foster district, is described under Granby; another supplies Bromptonville, and the third the district south of Sherbrooke. The Bromptonville line is 6 mi. long and operates at 48,000 v., 3 ph., 60 cy.; it consists of a single circuit of three ⅜-in. steel conductors, supported by pin-type insulators on wooden poles; lightning protection, horn-gap arresters. The only substation supplied is at Bromptonville. The third line extends from Sherbrooke to Rock Island, 38 miles, the voltage of transmission being 23,000 v., 3 ph., 60 cy.; maximum power transmitted, 1,800 h.p., with a loss of 10 percent. The line, which is valued at $80,000, consists of wooden poles with double petticoat insulators, supporting No. 4 copper or aluminium equivalent conductors; lightning protection, aluminium arresters, horn-gap arresters, and ground wires on the pole line. It supplies substations at Lennoxville, including Huntingville; Capelton; Eustis; Waterville, including Compton; North Hatley; Ayers Cliff, including Way Mills, Massawippi and East Hatley; Beebe; Rock Island; Stanstead; and also Derby Line, Vt. and Derby Centre, Vt. **Distribution**: Some 2,000 h.p. is distributed in Sherbrooke and vicinity, mostly for power purposes, while an additional 500 h.p. is used for electric railway operation. The system covers 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 16 line transformers. **Rates**: Rate for lighting, 10 cents per k.w.h., less a 25 per cent discount, with a minimum charge; flat rate for power, from $70 to $130 per k.w. per annum, according to amount; meter rate, from 0.6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w., the power rates being all subject to discounts up to 70 per cent, according to restrictions in use, with additional discounts for special conditions and 10 per cent for prompt payment.

SHIPSHAW, Chicoutimi Co. Supplied by Price Brothers & Co. from a hydro-electric plant on the Shipshaw river, 2 miles from its junction with the Saguenay. The energy is also transmitted to Kenogami and Jonquière for the operation of the company's paper and pulp mills, a small portion being also used for lighting purposes in the former place. **Hydraulic Plant:** Dam, 310 ft. long by 20 ft. high, constructed of stop logs, supported by concrete piers; a 14-ft. concrete tunnel 590 ft. long leads to a surge tank, and thence the water is carried to the power house through three 8-ft. steel penstocks. The power house is of reinforced concrete 80 x 44 ft., and contains three 3,500-h.p. turbines, operating under a head of 90 ft., and each direct connected to a 2,250-k.w., 3-ph., 60-cy., 7,000-v. generator. Two 150-k.w. exciters are operated from independent turbines. The plant was put in operation in 1913, and is valued at $900,000, including a storage dam, while the cost of generation is approximately $8.50 per h.p. per annum. **Transmission Lines:** Two 3-ph., 7,000-v. circuits, supported on the same pole line to Kenogami, a distance of 2½ mi. Each circuit transmits 3,200 k.w., with a loss of 4 per cent, the power factor being raised to 98 per cent by synchronous motors. The line consists of cedar poles supporting No. 0000 copper cables. Lightning protection: low equivalent arresters at both ends.

SOREL, Richelieu Co. (9,229†). Supplied by Sorel Light and Power Co., which purchases 1,800 h.p. at $25 per h.p. per year from the Shawinigan Water and Power Co. The Sorel Co. also distributes the following amounts of energy in other localities: Sorel, 640 k.w.; St. Joseph-de-Sorel, 400 k.w.; St. Roch, 50 k.w.; Contrecoeur, 30 k.w.; Verchères, 25 k.w.; Varennes, 25 k.w.; Boucherville, 20 k.w.; and a small amount in St. Ours; the proportionate amount for various uses is 1,200 h.p. for power, 400 h.p. for lighting and 200 h.p. for street



CROSS SECTION THROUGH POWER HOUSE OF CEDARS RAPIDS HYDRO-ELECTRIC PLANT. SHOWS 10,800 HORSE-POWER UNIT, LARGEST IN DIAMETER IN CANADA.

Courtesy of Montreal Light, Heat and Power Consolidated

lighting. The yearly load factor on the whole system is approximately 60 per cent. **Substations:** Total of 17 station transformers, ranging in capacity from 25 k.w. to 200 k.w., and stepping the voltage down from 11,000 v. to 2,200 v., 30 cy. **Distribution:** Including the various systems; 50 mi. of streets; primaries at 2,200 v., secondaries for lighting at 110 v., and for power at 440 v.; 150 line transformers, of 2,500 k.w. aggregate capacity. Connected load, 1,000 h.p. for lighting, 100 h.p. for appliances, and 2,000 h.p. for motors. Value of distribution systems, approximately $200,000. **Rates:** Meter rate for lighting, from 7·5 to 10 cents per k.w.h., less 20 per cent discount; for heating appliances, 2·5 cents per k.w.h., less 20 per cent discount; average flat rate for power, $40 per h.p. per year. Street lighting: 750-w. nitrogen-filled lamps, at $45 per lamp yearly.

STANBRIDGE EAST, Missisquoi Co. (172†). Supplied by M. S. Connell & Sons, from a hydro-electric plant on the Pike river. **Hydro-electric Plant:** Dam, 104 ft. long by 8 ft. high, with a 42-in. steel flume 127 ft. long, leading to a frame power house 40 x 24 ft.; available head, 9½ ft. Equipment: one turbine, geared and belted to a 17½-k.w., 110-v., d.c. generator. Plant installed in 1899; night service only. **Distribution:** 1½ mi. of streets, at 110 v., d.c.; number of consumers, 20, **Rates:** Flat rate, $3.00 per 25-w. lamp per year. Street lighting: 40-w. lamps, at $5 per lamp yearly.

STANSTEAD, Stanstead Co. (837). Supplied by Southern Canada Power Co. from the Rock Island substation of the Sherbrooke transmission system (see under Sherbrooke), the amount being 55 h.p., 68 per cent of the output being used for lighting and 32 per cent for power. **Distribution:** 2½ mi. of streets; primaries at 2,200 v. and secondaries at from 110 v. to 550 v.; 19 line transformers, of 72 k.w. total capacity, and ranging in size from ¾ k.w. to 10 k.w. Number of consumers, 101; connected load, 40 k.w. for lighting and 22 h.p. in motors. Distribution system valued at $5,000. **Rates:** Meter rate for lighting, 10 cents per k.w.h. less 25 per cent discount, with a monthly minimum; power rates are the standard for the company given under Sherbrooke. Street lighting: enclosed arcs and 16-c.p. lamps, at $50 for the former and $5 for the latter, yearly.

STAYNERVILLE, Argenteuil Co. Supplied by Ayers Limited. See under Lachute.

SUTTON, Brome Co. (986). Supplied under municipal control, being purchased in bulk from the Sweate-Comings Co., of Richford, Vt., whence it is transmitted 9 mi. at 6,600 v., 3 ph., the cost being 2¼ cents per k.w.h. at Richford. **Substation:** Three 20-k.w. and three 7½-k.w. transformers, stepping the voltage down from 6,600 v. to 2,200 v. **Distribution:** 6 mi. of streets, with 10 line transformers, of from 5 to 15 k.w. capacity. Number of consumers, 150; system valued at $15,000. **Rates:** Meter rate, 8 cents per k.w.h., with a yearly minimum. Street lighting: 40-w. lamps, at $12 per lamp per year.

SWEETSBURG, Missisquoi Co. (305). Supplied by Southern Canada Power Co. See under Cowansville.

TERREBONNE, Terrebonne Co. (1,990). Supplied under municipal control, being obtained in block at 1·5 cents per k.w.h., from the Laval Electric Co., which obtains it from Shawinigan Falls and also distributes in a portion of the town. See under Ste. Thérèse. **Distribution:** Supplied from the Laval Electric Co.'s substation at 2,200 v., the output being divided approximately into 85 per cent for lighting and 15 per cent for power; 3½ mi. of streets are covered; primaries at 2,200 v. and secondaries at 110 v.; 10 line transformers, of 100 k.w. total capacity. Number of consumers, 300; connected load, 225 k.w. for lighting, 100 h.p. in motors, and 50 k.w. in appliances. Distribution system valued at $20,000. **Rates:** Meter rate for lighting, from 5 to 8 cents per k.w.h.; for power from 2·5 to 4 cents per k.w.h. Street lighting: 40-w. tungsten lamps.

THETFORD, Megantic Co. (7,261). Distributed by the Continental Heat and Light Co., the Thetford Mines Electric Co. and the St. Francis Water Power Co.

Thetford Mines Electric Co.—A block of 750 h.p. is purchased from the Continental Heat and Light Co. at 2,200 v. and distributed, 60 per cent for lighting and 40 per cent for power, the system also supplying Black Lake. **Distribution:** 9 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 30 line transformers, of 240 k.w. total capacity. Number of consumers, 1,000; connected load, 350 k.w. for lighting and 300 h.p. in motors. Estimated value of distribution system, $120,000. **Rates:** Yearly flat rate for lighting, $4 per 16 c.p.; meter rate, 7 cents per k.w.h.; flat rate for power, from $30 to $50 per h.p.-year, according to restrictions. Street lighting: 100-w. tungsten lamps, at $12 per lamp yearly.

Continental Heat and Light Co.—Distributes to large power consumers only, purchasing in bulk from the Shawinigan Water and Power Co. at 1 cent per k.w.h. **Substation:** Three 2,000-k.w. station transformers step the voltage down from 44,000 v. to 2,400 v., 30 cy., and three of 150 k.w. step the voltage down from 25,000 v. to 2,400 v. Of the energy supplied approximately 5,000 k.w. is for power, while 500 k.w. is supplied in bulk for lighting purposes, giving a load factor of 80 per cent. The system covers approximately 20 mi. of streets, and supplies 20 consumers; connected load in motors, 5,000 k.w. **Rates:** Flat rate, $30 per h.p.-year.

St. Francis Water Power Co.—See under Disraeli.

THREE RIVERS, St. Maurice Co. (19,000*). Supplied by North Shore Power Co., being obtained partly from the Shawinigan Water and Power Co. and partly from the hydro-electric plant on the Batiscan river, at St. Narcisse. This system also comprises Ste. Angèle and Cap-Magdeleine. **Hydro-electric Plant:** Concrete dam, 150 ft. long by 10 ft. high, with a 6-ft. steel penstock 100 ft. long, leading to a stone power house 30 x 80 ft. with an extension 20 x 20 ft.; available head, 50 ft. Equipment: 3 units, one a 750-h.p. turbine, direct connected to a 600-k.w. generator and two 300-h.p. turbines, each direct connected to a 250-k.w. generator, all the energy being generated at 3 ph., 60 cy., 2,200 v. Maximum load: full capacity of the plant, the energy being used, together with the Shawinigan power, to supply the Three Rivers system. Plant installed in 1893. **St. Narcisse Transmission Line:** 18 mi. long, with an additional 9-mi. tap to Champlain. It operates at 10,000 v., 3 ph., 60 cy. and consists of two circuits each of three copper conductors, both No. 6 and No. 4 being used, supported by pin-type insulators on the same pole line. Lightning protection: gap arresters at each end, and every pole is grounded. The following substations are supplied in addition to Three Rivers, with the amount of power indicated. Champlain, 100 k.w.; Ste. Geneviève, 60 k.w.; St. Maurice, 20 k.w.; while St. Narcisse and St. Stanislas are supplied directly at 2,200 v. from the power plant. **Substation:** Station transformers step the voltage down both from 50,000 v. and 10,000 v. to 2,200 v. at both 30 and 60 cy.; 2,500 k.w. is distributed from this substation, divided into 17 per cent for lighting, 78 per cent for power, and 5 per cent for street railway. **Distribution:** Including Three Rivers, Ste. Angèle and Cap-Magdeleine: comprises 51 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 210 line transformers, of 4,220 k.w. total capacity. Number of consumers, 3,270; connected load, 1,100 k.w. for lighting, 3,470 h.p. in motors and 1,500 k.w. in appliances. **Rates:** Meter rate for lighting, from 4 to 8 cents per k.w.h., less 10 per cent discount, with a minimum charge; for appliances, 1 cent per k.w.h., plus a fixed charge based on capacity. Rates for power, from 1 to 1·5 cents per k.w.h., plus a fixed charge of from $5 to $12 per h.p.-year, according to amount of power supplied. Street lighting: magnetite arcs, and enclosed arcs, at $50 per lamp yearly, and nitro lamps of various sizes, at from $20 per 60-c.p. to $50 per 600-c.p. unit yearly.

TRING JUNCTION, Beauce Co. (308†). Supplied by Beauce Electric Co. See under St. Joseph, Beauce. **Substation:** One 25-k.w., single-ph. station transformer steps the voltage down from 15,000 v. to 2,200 v. **Distribution:** ½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; two line transformers, of 10 k.w. total capacity. Number

of consumers, 16; connected load, 5 k w. for lighting and 10 h.p. in motors. **Rates:** Yearly flat rate for lighting, from $4.20 to $6 per 16-c.p and 15 cents per watt for high efficiency lamps; net meter rate, 11·25 cents per k.w.h., plus meter rental, with a yearly minimum of $1 per lamp; meter rate for power, from 1 to 2 cents per k w.h., plus a monthly fixed charge of $1.50 per h.p.; flat rate for power, $30 per h.p.-year.

VAL-BRILLANT, Matane Co. (866*). Supplied by La Compagnie Electrique d'Amqui. See under Amqui.

VALLEYFIELD, Beauharnois Co. (9,449). Supplied by Valleyfield Electric Co., in connection with the Montreal Cotton Co., the hydro-electric plant forming a portion of the latter company's development. **Hydraulic Plant:** Situated in a narrow channel parallel with the Coteau rapids, in Valleyfield. Water is led through two 5-ft. steel conduits 30 ft long to a brick power house 40 x 45 ft.; available head, 10 ft. Equipment: 2 water wheels of 75 h.p. and 175 h.p., respectively, belted through a countershaft to a 200-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 135 h.p.; load factor, 50 per cent. Slight trouble is sometimes experienced from frazil ice. The plant, which gives a continuous service, is stated to be one of the pioneer hydro-electric installations in Canada, dating back to the early eighties. It has been renewed since, however, and its present value is estimated at $35,000. **Distribution:** 5 mi. of streets; 48 line transformers, of from 2½ k.w. to 75 k.w. capacity; primaries at 2,300 v. and secondaries at 110 v. and 220 v. Number of consumers, 548, of which 23 are for power; connected load, 400 k.w. **Rates:** Meter rate for lighting, 5 cents per k.w.h.; for heating appliances, 1·5 cents per k.w.h.; flat rate for power, from $20 to $25 per h.p.-year.

Municipal Street Lighting System—Operated by the municipality, 100 h.p. of energy being obtained in block from the Valleyfield Electric Co. in return for certain grants. The system comprises 45 a.c. arcs and 150 tungsten lamps of 100 c.p. to 250 c.p. The total value is $18,000; yearly cost, $38 per arc and $15 per tungsten lamp.

VALLEY JUNCTION, Beauce Co. Supplied by Beauce Electric Co. See under St. Joseph, Beauce. **Substation:** One 80-k.w. single-ph. station transformer, stepping voltage down from 15,000 v. to 2,200 v. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 5 line transformers, of 25 k.w. total capacity. Number of consumers, 78; connected load, 23 k.w. for lighting and 18 h.p. in motors. **Rates:** Yearly flat rate for lighting, from $4.20 to $6 per 16-c.p. and 15 cents per watt for high efficiency lamps; net meter rate, 11·25 cents per k.w.h., plus meter rental, with a yearly minimum of $1 per lamp; meter rate for power, from 1 to 2 cents per k.w.h., plus a monthly fixed charge of $1.50 per h.p.; flat rate for power, $30 per h.p.-year.

VARENNES, Verchères Co. (1,051*). Supplied by the Sorel Light and Power Co. See under Sorel.

VAUDREUIL, Vaudreuil Co. (495*). Supplied by the Montreal Light, Heat and Power Consolidated. See under Montreal. **Distribution:** 2½ mi. of streets, supplying 60 consumers. **Rates:** Meter rate, 12 cents per k.w.h. Street lighting: 60-w. lamps, at $15 per lamp yearly.

VERCHERES, Verchères Co. (884*). Supplied by Sorel Light and Power Co. See under Sorel.

VERDUN, Jacques-Cartier Co. (23,000*). Supplied under municipal control, 250 h.p. at $27.50 per h.p.-year, at 2,300 v., being obtained in block from the Montreal Light, Heat and Power Consolidated, while the peak load is helped out from the municipal steam plant, where steam is kept up for water-works. Energy is also distributed directly by the Montreal Light, Heat and Power Consolidated. **Steam Plant:** Brick building 40 x 180

ft., including space for water-works. Equipment: two 310-h.p. and one 250-h.p. water-tube and two 125-h.p. return-tubular boilers; two generator units, each consisting of a 300-h.p. vertical engine, direct connected to a 235-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum oad on the steam plant is at times its full capacity for short periods, being used each day at peak load as auxiliary. Fuel: 3,500 tons of anthracite screenings, at $4.65, 1,500 tons of bituminous coal, at $10.30, yearly. Plant installed in 1910, and valued at $48,000. **Distribution:** 30 mi. of streets; primaries at 2,300 v. and secondaries from 110 v. to 550 v.; 40 line transformers, of from 1 k.w. to 30 k.w., and of 400 k.w. total capacity. Number of consumers, 4,200; connected load, 1,500 k.w. for lighting and 685 h.p. in motors. Of the latter, however, 600 h.p. for sewage pumps are only used occasionally. Distribution system valued at $110,250. **Rates:** Meter rate for lighting, 5 cents per k.w.h. net; flat rate for lighting, 0·5 cent to 1 cent per watt per month for commercial uses; for power, from $20 to $25 per h.p. per year, according to restrictions. Street lighting: magnetite arc lamps, at $65 per lamp.

VICTORIAVILLE, Arthabaska Co. (3,028). Supplied by Arthabaska Water and Power Co., about 200 k.w. being purchased in bulk from the Shawinigan Water and Power Co. **Substation** (property of the Shawinigan Co.): Three 100-k.v.a. station transformers, reducing the voltage from 50,000 v. to 2,300 v., 30 cy. The load may be divided into 100 k.w. for lighting, 150 k.w. for power, and 18 k.w. for street lighting, giving a yearly load factor of 52 per cent. **Distribution:** 18 mi. of streets; 56 line transformers, of from 2½ k.w. to 15 k.w. capacity; primaries at 2,200 v. and secondaries at 220 v. and 110 v., while the large power consumers are supplied at 2,300 v., 3 ph. Number of consumers, 702 for lighting and 24 for power; connected load, 800 k.w., this comprising 230 h.p. for motors. Value of system, $30,000. **Rates:** Meter rate for lighting, from 9 to 13 cents per k.w.h., according to consumption; for cooking, 4 cents per k.w.h.; flat rate for lighting, from 30 cents per 16-c.p. to 90 cents per 100-w. lamp per month, the corresponding commercial rate being 45 cents and $1.35; all above lighting rates are subject to 20 per cent discount; flat rate for power, from $32.50 to $44 per h.p.-year according to amount and restriction in use, the meter rate for power from 2 to 4 cents per k.w.h., all power rates being subject to a 10 per cent discount. Street lighting: 60-w. lamps and 100-w. nitrogen lamps, at, respectively, $8 and $12.33 per lamp per year.

WAKEFIELD, Ottawa Co. (293†). Supplied by F. T. Cross. See under Farm Point.

WATERLOO, Shefford Co. (1,886). Supplied by Southern Canada Power Co. See under Foster.

WATERVILLE, Compton Co. (1,054). Supplied by Southern Canada Power Co. See under Sherbrooke. Compton, which is supplied from the same substation is also included in this description. **Substation:** Equipment (outdoor type): two 100-k.v.a transformers, reducing the voltage from 22,000 v. to 2,200 v., 3 ph.; 80 per cent of output for lighting and 20 per cent for power. **Distribution:** Including Compton and its supply line; 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 550 v.; 20 line transformers, of from ½ k.w. to 75 k.w. capacity. Number of consumers, 120; connected load, 44 k.w. for lighting and 133 h.p. in motors. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 25 per cent discount with a monthly minimum; flat rate for power, from $70 to $130 per k.w. per year, according to amount; meter rate, from 0·6 cent to 5 cents per k.w.h., plus a monthly fixed charge of from $2 to $8 per k.w. The power rates are subject to discounts up to 70 per cent, according to restriction in use with additional discounts for duration of contract, prompt payment, etc. Street lighting: 40-w. and 60-w. tungsten lamps, at $5 per lamp yearly.

WAY MILLS, Stanstead Co. (101†). Supplied by Southern Canada Power Co. See under Ayers Cliff.

WEEDON, Wolfe Co. (836). Supplied by St. Francis Water Power Co. Amount taken, 550 h.p. Fontainebleau is also supplied from the same system. **Substation:** Two 250-k.w., single-ph. station transformers and one 100-k.w., 3-ph. unit, stepping the voltage down from 15,000 v. to 2,200 v., 3 ph., 60 cy. Load divided, 5 per cent for lighting and 95 per cent for power. **Distribution:** Including Fontainebleau, 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 6 line transformers, of 30 k.w. total capacity. Number of consumers, 90; connected load, 32 k.w. for lighting and 530 h.p. in motors. System valued at $20,000. **Rates:** Yearly flat rate for lighting, from $4.20 to $6 per 16-c.p. and 15 cents per watt for high efficiency lamps; net meter rate, 11·25 cents per k.w.h., plus meter rental, with a yearly minimum of $1 per lamp; meter rate for power, from 1 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1.50 per h.p.; flat rate for power, $30 per h.p.-year. Street lighting: 16-c.p. lamps, at $4 per lamp yearly.

WESTMOUNT, Hochelaga Co. (18,260*). Supplied from two sources, one under municipal control and the other the Montreal Light, Heat and Power Consolidated. See under Montreal.

Municipal System—The municipal electric power plant is operated in conjunction with the city refuse destructor, an additional 500 k.w. being also purchased from the Montreal Light, Heat and Power Consolidated at an average rate of $31 per k.w. per year. **Steam Plant:** Two brick buildings, each 50 x 100 ft., used for the power plant proper. Equipment: five 200-h p. water-tube boilers, at 160 lbs. pressure, and four cross-compound engines, one of 600 h.p., two others of 350 h.p. each, and the fourth of 200 h.p., direct connected, respectively, to a 400-k.w. two 200-k.w. and a 125-k.w. 3-ph. 60-cy. 2,300-v. generator. Fuel: both coal and city refuse, 1,500 tons of the former and 20,000 tons of the latter being consumed yearly, the equivalent value of coal being estimated at $8,500. Maximum demand, 1,200 k.w., with a load factor of 37 per cent, the output being divided, approximately, 48 per cent for lighting, 29 per cent for power and 23 per cent for street lighting. The plant, which was installed in 1906 and enlarged in 1910, gives a continuous service, and is valued at $187,000. **Distribution:** 21 mi. of streets, 12 mi. being underground; primaries at 2,200 v. and secondaries at 110 v.; 210 line transformers, of from 2½ k.w. to 50 k.w. capacity. Number of consumers, 3,100; connected load, 3,550 k.w. for lighting and 680 k.w. for motors. Total value of the street distribution, including elaborate street lighting equipment, $383,000. **Rates:** Meter rate for lighting, 5 cents per k.w.h.; for heating appliances, 1·5 cents per k.w.h.; flat rate for power, from $20 to $50 per h.p.-year, according to amount and restriction in use. Street lighting: 6.6-amp. and 4-amp. megnetite arc lamps, at $100 and $60 for the respective sizes per lamp per year.

WEST SHEFFORD, Shefford Co. (363). Supplied by S. Rousseau from a local hydro-electric plant on the Yamaska river. **Hydro-electric Plant:** Stone-filled dam, 200 ft. long by 7 ft. high, affording 8 feet head; the water power is also used in connection with a saw-mill. A 100-h.p. turbine, which also operates the latter, is belted to a 33-k.w., single-ph., 1,100-v. generator. Maximum load, 10 k.w. The plant, which was installed in 1907, only gives a night service and is valued at $10,000, including the system of distribution. **Distribution:** 2½ mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 10 line transformers, of from 1 k.w. to 2½ k.w. capacity. Number of consumers, 50; connected load, 19 k.w. for lighting. **Rates:** Meter rate for lighting, 15 cents per k.w.h.; flat rate, $5 per lamp per year. Street lighting: 60-w. tungsten lamps, at $6 per lamp yearly.

WINDSOR MILLS, Richmond Co. (2,144†). Supplied under municipal control, being secured from the Canada Power Co., which obtains it from the Shawinigan Co. A block of 30 h.p. is obtained by the municipality, at $30 per h.p.-year, while the surplus power is charged by meter at 1·5 cents per h.p.-hour. **Substation:** Two 25-k.v a. transformers, stepping the voltage down from 2,200 v. to 1,100 v., 30 cy. **Distribution:** 6¼ mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 14 line transformers, of 75 k.w. total capacity. Number of consumers, 250; connected load, 125 k.w. for lighting and 18 h.p. in

motors. Distribution system valued at $4,000. **Rates:** Meter rate for lighting, 8 cents per k.w.h., less 25 per cent discount; for power, 2 cents per k.w.h. Street lighting: 60-w. tungsten lamps.

YAMACHICHE, St. Maurice Co. (965). Distributed by La Cie. d'Eclairage de Yamachiche, a block of 75 h.p. at 13,200 v. being obtained from the Shawinigan Water and Power Co., from the Charette substation, at 1·5 cents per k.w.h., with a yearly minimum of $700. The system also includes St. Barnabé, St. Sévère, Charette, St. Elie, St. Paulin and St. Boniface. **Transmission Lines:** The 13,200-v. lines of this system aggregate some 42 mi.; one line from Charette extends to Yamachiche and another north to St. Elie, with branches to St. Boniface and St. Paulin. **Substation:** One 20-k.w. transformer at Yamachiche; others supplying local distribution systems along the line include two 15-k.w. and one 20-k.w. transformers, all stepping the voltage down from 13,200 v. to 2,200 v. **Distribution:** The local systems from the substations cover 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 20 line transformers, of 125 k.w. total capacity. Number of consumers, 300; connected load, 180 k.w. for lighting and 75 h.p. for power. No street lighting has yet been installed. The entire system, including transmission lines is valued at $55,000. **Rates:** Meter rate is 8 cents per k.w.h.

ONTARIO

Hydro-Electric Power Commission System

OWING to the importance of the various developments and transmission systems of the Hydro-Electric Power Commission in the supply of electric energy in Ontario, a few general notes will give a better understanding of the situation in this province.

The creation of the first Commission, in 1903, may be credited to public agitation to prevent monopoly in the distribution of Niagara power throughout southern Ontario. The Commission's first report, in 1906, further interested the public in the commercial value of Niagara falls and the feasibility of transmitting its power to the various municipalities in southwestern Ontario. Work was begun in 1909 on a comprehensive transmission system, and, by the end of 1910, a total of 280 miles of 110,000-volt lines had been completed; shortly afterwards, some 13 municipalities were being supplied.

The operations of the Commission have since rapidly increased and cover the development as well as the purchase in bulk and transmission of hydro-electric energy to other portions of the province in addition to the extensive net-work now being supplied from Niagara. They include 12 hydro-electric plants, 1,992 miles of high tension lines, of which 435 miles are at 110,000 volts, and supply upwards of 200 municipalities with electric energy.

The expenditure on capital account to October 31, 1917, by the Ontario Hydro-Electric Power Commission is as follows:

Niagara system	$14,386,531.27	Port Arthur system	$ 109,438.17
Severn system	867,971.36	Central Ontario system / Nipissing system	9,505,249.49
Eugenia system	7,271,736.11		
Wasdell system	264,731.27	Ontario Power Co.	7,996,617.42
Muskoka system	190,239.80	Renfrew (storage dam)	20,389.43
St. Lawrence system	207,234.30	General accounts, stores, etc.	2,356,329.98
Ottawa system (meter equipment)	432.39	Total	$37,176,900.99

A general description of each of the above systems is given hereunder, while details as to distribution, rates, etc., will be found under each municipality served, the latter being alphabetically arranged with the others of the province.

Niagara System—The electric energy supplying this system is obtained from the power plant formerly owned by the Ontario Power Company but now controlled by the Hydro-Electric Power Commission, and also from the Canadian Niagara Power Co. Both of these plants, being situated at Niagara Falls, are described thereunder. The energy is transmitted to the Hydro-Electric Power Commission substation, less than ½ mile from the first mentioned plant, at 12,000 v. The substation is of brick and steel, 380 x 70 ft., and contains 25 station transformers, each a single-ph. unit, of which three are of 7,500 k.v.a. capacity and 22 of 3,500 k.v.a., stepping the voltage up from 12,000 v. to 110,000 v., and 10 single-ph. units of 3,500 k.v.a. capacity, stepping the voltage up from 12,000 v. to 45,700 v. All the energy is at 3 ph., 25 cy., the station transformers having a total capacity of 134,500 k.v a. **Transmission Lines:** The transmission system will be better understood by referring to the map facing page 88. the general method adopted being to use 110,000 v. for the main arteries. This voltage is reduced at district transformer stations to 6,600 v., 13,200 v. or 26,400 v., lines at this pressure radiating to local substations, where it is further reduced

Note—Except where otherwise stated, the statistics of population have been extracted from the Census of 1911.

See page for explanation of abbreviations used in this report.

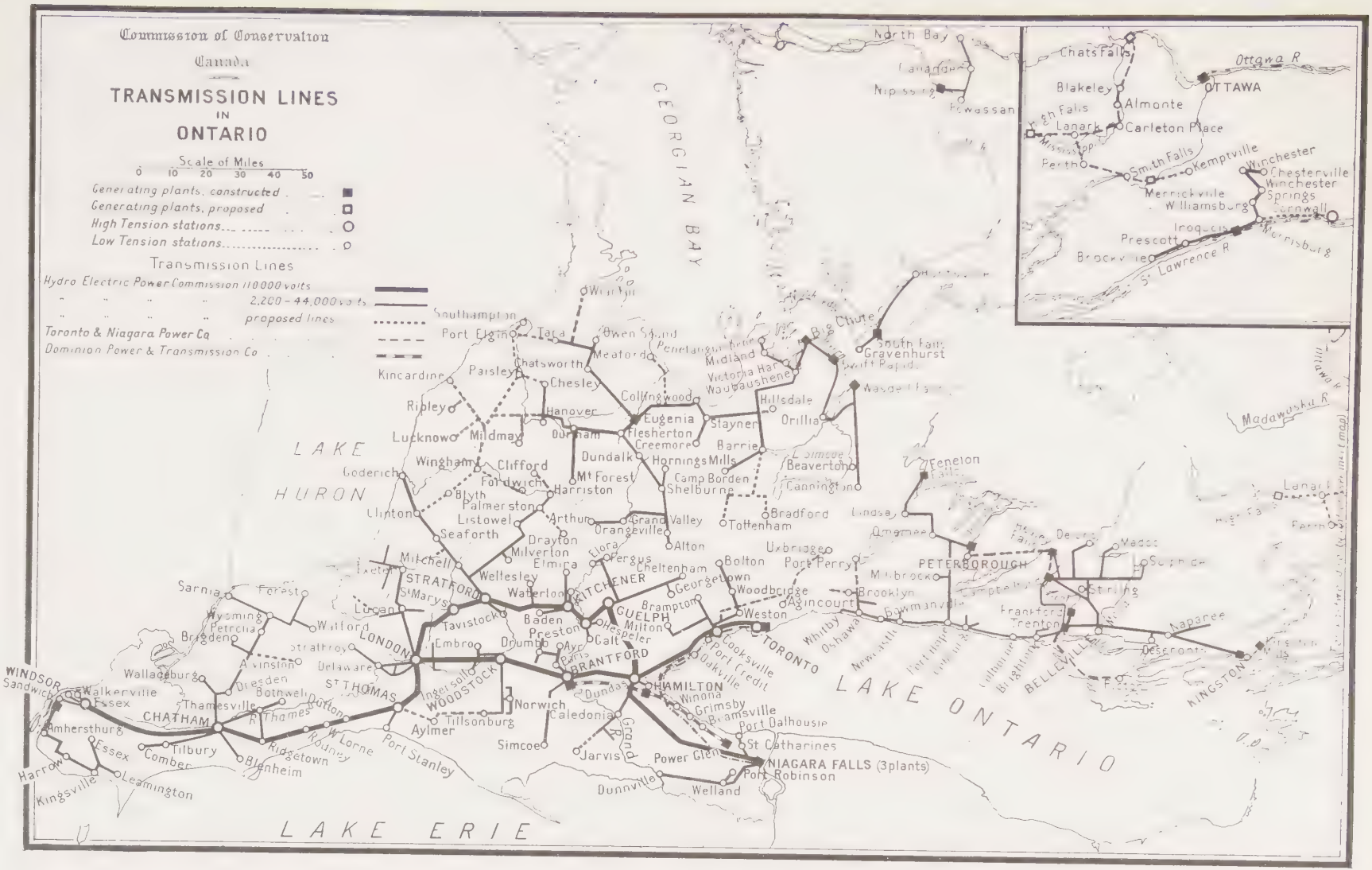
* Population statistics with an asterisk have been obtained from the Provincial Statistics.

† Population statistics with a dagger have been obtained from the municipality.

to 2,300 v. or 4,000 v. for street distribution. The system comprises 435 mi. of 110,000-v. lines, of which 325 mi. are double circuit and 110 mi. single circuit, 3 conductors, both aluminium and copper of various sizes being used, supported by suspension insulators on steel towers which are spaced 525 ft. apart; lightning protection, electrolytic arresters and two overhead ground wires. The 6,600-v., 13,200-v. and 26,400-v. lines cover a total of 765 mi., of which 217 mi. are double circuit and 548 mi. single circuit; there are also 17 mi. of 46,000-v. lines, all being 3 conductors, both aluminum and copper of various sizes being used, supported by pin-type insulators on both wooden poles and steel towers; lightning protection, electrolytic arresters and ground wires. The cost, or value, per mile of the various types of transmission lines is as follows: 13,200-v. to 26,400-v. lines with wooden poles, $2,200 per mile for single circuit and $3,000 per mile for double circuit; 110,000-v. lines, $14,000 per mile for double circuit. The maximum load taken by this system is 200,983 h.p., while the average daily load factor is 92 per cent. The cost to the Commission for energy at 12,000-v. pressure at Niagara Falls is $9 per h.p. per year, while the prices charged the various municipalities served are adjusted according to the distance the power has to be transmitted, the amount taken and other similar conditions. The station transformer capacity for stepping the voltage down from 110 000 v. to 13,200 v. or 26,400 v. at the various district stations, is as follows: Dundas, 15,000 k.v.a.; Toronto, 67,500 k.v.a.; London, 8,750 k.v.a.; Guelph, 5,000 k.v.a.; Preston, 4,500 k.v.a.; Kitchener, 6,750 k.v.a.; Stratford, 3,750 k.v.a.; St. Marys, 3,000 k.v.a.; Woodstock, 3,000 k.v.a.; St. Thomas, 4,300 k.v.a.; Cooksville, 5,000 k.v.a.; Brant (near Brantford), 5,000 k.v.a.; Kent (near Chatham), 5,000 k.v.a.; Essex, 10,000 k.v.a.

Severn System—This system supplies the territory in the northern and central portions of Simcoe county between Georgian bay and lake Simcoe, the energy being obtained from a hydro-electric plant on the Severn river at Big chute, 9 miles from the mouth. **Hydro-Electric Plant:** Development includes dams at the head of each of the three channels into which the river is divided at this point; the one at Big chute, the principal point of discharge, is 50 ft. long by 18 ft. high, of concrete piers and sills with stop logs and spill crests; Pretty Channel dam is of somewhat similar construction with no spill crest; Lost Channel dam is in a narrow gorge, and is of concrete with one spill-way. Near Big Chute dam a canal, through rock, 32 ft. wide and 500 ft. long, leads to a forebay, whence the water is carried through a 9-ft. penstock, 150 ft. long, to the concrete power house, 120 x 60 ft., where a 58-ft. head is available. The pipe ends in a surge tank. Present equipment: three 1,300-h.p. turbines, each direct connected to a 900-k.v.a, 3-ph., 60-cy., 2,200-v. generator, with two 100-k.w. independent exciter units; six 600-k.w. station transformers step the voltage up from 2,200 v. to 25,000 v. Maximum load, 3,200 h.p., with a load factor of 80 per cent. Provision is made for the installation of a second penstock and an additional 2,300-h.p. unit to give an ultimate total capacity of 6,200 h.p. Value of plant, $349,787; cost of generation, $14 per h.p. per year; in operation since 1911; continuous service. **Transmission Line:** Energy is transmitted at 22,000 v. to 23,000 v., 3 ph., 60 cy. Two lines extend to Waubaushene; thence, one to Penetanguishene on the north and one to Barrie and Collingwood on the south and west, 28, 44 and 66 miles, respectively, from Big chute. Each line has additional taps, while the system is also tied to the Eugenia system at Collingwood and to the Wasdell system through the Orillia system. From the plant there are two pole lines, each with a single circuit, to Waubaushene; the remainder of the system is single line with two circuits; all circuits are of three conductors, mostly aluminium, from No. 0000 to No. 0, with a short portion of No. 2 conductor; the tie line of the Wasdell system is a single circuit of three No. 2 aluminium conductors; all wooden-pole lines with pin-type insulators. Lightning protection, electrolytic and resistance-type arresters and ground wires. Lines cover a total of 103 mi.; value, $355,497. The step-down transformer capacity at each substation supplied is as follows: Penetanguishene, 600 k.v.a; Barrie, 700 k.v.a.; Collingwood, 1,200 k.v.a.; Coldwater, 50 k.v.a.; Elmvale, 225 k.v.a.; Stayner, 300 k.v.a.; Port McNicoll, 50 k.v.a.; Waubaushene, 50 k.v.a.; Midland, 900 k.v.a; C.P.R. (Port McNicoll), 1,500 k.v.a.; Camp Borden; Victoria Harbour, 100 k.v.a.

Wasdell System—This system covers a narrow area east of lake Simcoe, and stretching north and south. It is supplied from the hydro-electric plant at Wasdell falls, on the Severn


Commission of Conservation
Canada
TRANSMISSION LINES
IN
ONTARIO
Scale of Miles
0 10 20 30 40 50
Generating plants, constructed
Generating plants, proposed
High Tension stations
Low Tension stations
Transmission Lines
Hydro Electric Power Commission 110000 volts
" " " " 2,200 - 44,000 volts
" " " " proposed lines
Toronto & Niagara Power Co
Dominion Power & Transmission Co
LAKE HURON
GEORGIAN BAY
LAKE ONTARIO
LAKE ERIE
North Bay
Nipissing
Powassan
Chats Falls
Ottawa R
OTTAWA
Blakeley
Almonte
Carleton Place
Lanark
Perth
Smith Falls
Kemptville
Winchester
Chesterville
Winchester Springs
Cornwall
Merrickville
Williamsburg
Iroquois
Prescott
Brockville
St Lawrence R
Morrisburg
Big Chute
South Falls
Gravenhurst
Swift Rapids
Waubaushene
Victoria Harbour
Midland
Penetanguishene
Owen Sound
Meaford
Thornbury
Wiarton
Southampton
Port Elgin
Tara
Kincardine
Paisley
Chatsworth
Chesley
Ripley
Lucknow
Hanover
Mildmay
Durham
Eugenia
Flesherton
Creemore
Collingwood
Stayner
Hillsdale
Orillia
Barrie
Madawaska R
Wingham
Clifford
Goderich
Fordwich
Mt Forest
Harriston
Dundalk
Hornings Mills
Camp Borden
Shelburne
Beaverton
Cannington
Fenelon Falls
Blyth
Palmerston
Clinton
Listowel
Arthur
Grand Valley
Orangeville
Tottenham
Bradford
Lindsay
Lanark
Seaforth
Drayton
Milverton
Elmira
Alton
Uxbridge
Port Perry
Mitchell
Exeter
Elora
Fergus
Cheltenham
Bolton
Georgetown
Woodbridge
Brooklyn
Sarnia
Forest
Wellesley
Waterloo
Brampton
Weston
Agincourt
Bowmanville
Oshawa
Whitby
Newcastle
Port Hope
Cobourg
Brighton
Colborne
Trenton
Belleville
Deseronto
Napanee
Kingston
Wyoming
Petrolia
Watford
Bridgen
Lucan
St Marys
Tavistock
Baden
Preston
Hespeler
Galt
Milton
Embro
Drumbo
Ayr
Paris
Strathroy
Delaware
Avonsion
Wallaceburg
Dresden
Botnwell
Thamesville
Essex
Walkerville
Sandwich
WINDSOR
CHATHAM
Amherstburg
Harrow
Kingsville
Leamington
Tilbury
Comber
Blenheim
Ridgetown
Rodney
Aylmer
Port Stanley
Thames R
Dutton
Ingersoll
Tillsonburg
Norwich
Caledonia
Simcoe
Jarvis
Dunnville
Welland
Power Glen
Port Robinson
NIAGARA FALLS (3 plants)
Grand R
Dundas
Winona
Grimsby
Bramsville
Port Dalhousie
St Catharines
Port Credit
Brooksville
Oakville
Weston
Toronto
Hamilton
Brantford
London
Stratford
Kitchener
Guelph
Woodstock
St Thomas
Peterborough
Lindsay
Omemee
Millbrook
Brooklyn
Frankford
Trenton
Belleville
Deseronto
Napanee
Kingston
Strilng
Madoc
Lanark
Perth

river, three miles below lake Couchiching. **Hydro-electric Plant:** Concrete stop-log type dam, 110 ft. long by 14 ft. high, with an adjacent concrete power house 67 x 49 ft., which forms a continuation of the dam; available head, 12 ft. Equipment: two vertical-shaft units, each a 600-h.p. turbine, coupled to a 400-k.v.a., 3-ph., 60-cy., 2,300-v. generator; seven 150-k.v.a. station transformers step the voltage up from 2,300 v. to 22,000 v., 3 ph., 60 cy., these being arranged in two banks of three transformers each, with one as a spare. Maximum load, 800 h.p., with a load factor of 92 per cent. Plant valued at $136,658; cost of generation $17 per h.p. per year. It began operations in 1914. **Transmission Lines:** Energy is transmitted to Beaverton, Cannington and to the Severn system at 22,000 v., 3 ph., 60 cy. Total length of Wasdell system, 46 mi.; value, $114,406. It consists of one circuit of three conductors, No. 0 aluminium for tie line and $\frac{5}{16}$ in. and $\frac{1}{4}$ in. steel cable for emainder, supported by pin-type insulators on wooden poles. Lightning protection, electrolytic and low equivalent arresters and choke coils. Transformer capacity of Beaverton substation, 300 k.v.a., Brechin being also supplied from it; Cannington substation, which also provides for Sunderland and Woodville, also has a 300-k.v.a. capacity.

Eugenia System This system covers portions of Grey, Dufferin and Bruce counties, and is west of, and adjacent to, the Severn system. It is supplied from a hydro-electric plant at Eugenia falls, on Beaver river, seven miles northeast of Flesherton. **Hydro-Electric Plant:** The development, which is remarkable as affording one of the highest heads utilized in Canada, namely 540 ft., includes a concrete dam above the fall, 2,000 ft. long by 51 ft. high, providing a pondage of 800,000,000 cu. ft., from which the water is led through a canal 5,000 ft. long to a smaller pond formed by a second dam, of earth-filled type, 30 ft. high by 800 ft. long, in which is a reinforced concrete gate house, providing for two pipes, one of which is at present installed. The pipe is wood-stave construction, 46 in. diameter and 3,350 ft. long; it is controlled by a 66-in. electrically-operated butterfly valve, and terminates in a surge tank on the brow of the escarpment, whence a 52-in. steel penstock, 1,559 ft. long, descends to the power house, ending in a 50-in. butterfly valve installed near the turbine. The brick power house, 36 x 56 ft., contains two 2,250-h.p. turbines, each direct connected to a 1,411-k.v.a., 3-ph., 60-cy., 4,000-v. generator, an exciter being also direct connected to each main unit; also three 900-k.v.a. station transformers, stepping the voltage up from 4,000 v. to 22,000 v., 3 ph., 60 cy., and other auxiliary and switchboard apparatus. Maximum load, 4,200 h.p., with a load factor of 85 per cent. The upper portion of the hydraulic works provides for a capacity double that at present operating; a 4,000-h.p. unit, with its appurtenances, is being added, which will bring the plant to over 8,000 h.p. capacity. Space is provided for a third 4,000-h.p. unit, making the ultimate capacity 12,000 h.p. Additional storage capacity of 300,000,000 cu. ft. is also possible by the construction of a dam at Feversham. Value of plant, $600,000; it began operation in 1915, and gives continuous service; cost of generation, $16 per h.p. per year. **Transmission Lines:** The lines radiate from the Eugenia plant in three main directions, terminating, respectively, at Owen Sound, 33 miles distant, Orangeville, 47 miles, and Chesley, 46 miles, the latter line being tapped at Durham by a line running south to Mount Forest. Energy is transmitted at 22,000 v., 3 ph., 60 cy., each line consisting of one or two circuits each of three conductors of various sizes, supported by pin-type insulators on wooden poles. Lightning protection, electrolytic and low-equivalent arresters and ground wires. Total mileage of 22,000 v. transmission lines on this system, 176 mi.; value, $409,336, including 47 mi. of 4,000-v. distribution lines. The Owen Sound line supplies substations of the following capacities: Chatsworth, 75 k.v.a.; Owen Sound, 1,650 k.v.a.; Kilsyth, 75 k.v.a.; while on the Chesley line, Durham (including Holstein), 150 k.w.; Mount Forest, 300 k.v.a.; Hanover, 375 k.v.a.; Chesley, 300 k.v.a.; on the Orangeville line, Dundalk, 150 k.v.a.; Shelburne (including Horning Mills), 150 k.v.a.; Orangeville (including Alton), 450 k.v.a.; Grand Valley (including Arthur), 225 k.v.a. Flesherton and Markdale are both supplied directly from the power house at the generator voltage of 4,000 v. and require no station transformers. The Wasdell, Severn and Eugenia systems have been inter-connected by short lines at adjacent points and their parallel operation has added security to the service; they may also be joined to the Niagara system, through a frequency-changing station, thus forming a very extensive interconnected network.

Muskoka System—This system supplies a narrow area, extending along the Grand Trunk Ry., from Gravenhurst to Huntsville, in the Muskoka district. Energy is obtained from a hydro-electric plant at South falls, on the South branch of the Muskoka river, seven miles north of Gravenhurst. **Hydro-electric Plant:** The development consists of a concrete dam, 20 ft. high by 80 ft. long, with two pipes, one 3-ft. steel and one 5-ft. wood-stave, each 1,000 ft. long, leading to a brick power house; available head, 105 ft. The installation includes two turbines, of 700 h.p. and 1,060 h.p., direct connected, respectively, to a 450-k.v.a. and a 750-k.v.a., 3-ph., 60-cy., 6,600-v. generator and three 400-k.v.a. station transformers, stepping the voltage up from 6,600 v. to 22,000 v. Maximum load, 950 h.p.; load factor, 75 per cent. The plant commenced operation in 1909. **Transmission Lines:** Energy is transmitted from the power plant to Gravenhurst, 7 mi., at the generator voltage of 6,600 v.; amount supplied, 250 h.p. The line from South falls to Huntsville, 26 miles, operates at 22,000 v., 850 h.p. being supplied. This line, valued at $52,650, consists of a single circuit of three No. 2 aluminum conductors, supported by pin-type insulators on wooden poles. Lightning protection, electrolytic and low-equivalent arresters and ground wires.

Central Ontario System—This system includes the former holdings of the Electric Power Co., which were acquired by the Ontario Government in 1916 and the property is now operated by the Hydro-Electric Power Commission. It includes certain water-works, street railway, gas and other plants. The territory supplied covers the north shore of lake Ontario, from Whitby to Kingston, extending inland to Lindsay, Peterborough and Sulphide. Energy is supplied from six hydro-electric plants at different points on the system, all on the Trent canal, in connection with which there is an extensive system of water conservation. Dams have been built at the outlets of many lakes on tributary streams, and the water is stored until such times in the summer and autumn seasons as it may be required for navigation and power purposes. Control of the flow is being constantly improved by the further utilization, to the fullest extent, of the natural storage basins of the Trent valley. The peak load on the whole system is 26,000 h.p., while the capacity of each power station varies from 750 k.w. at Fenelon falls to 6,000 k.w. at Healey fall. The other power plants are at Trenton, Frankford, Campbellford and Peterborough. Energy is also purchased for the system, 1,250 k.w. from the corporation of Campbellford and 1,120 k.w. from the Peterborough Hydraulic Power Co. **Trenton Hydro-electric Plant:** Situated at No. 2 dam of the Trent canal. The dam is of concrete, 25 ft. high by 500 ft. long, affording 20-ft. head, with an adjacent brick power house, 120 x 40 ft., which contains four 1,400-h.p. vertical turbines, each direct connected to a 937-k.v.a, 3-ph., 60-cy., 6,600-v. generator. Station transformers are in a separate building, and include three 3-ph. units, each of 3,060 k.v.a. capacity, stepping the generator voltage up to 44,000 v. Maximum load, 3,700 k.w.; load factor, 65 per cent. Plant installed in 1911. **Frankford Hydro-electric Plant:** Situated at No. 5 dam of the Trent canal. The dam is of concrete, 500 ft. long by 25 ft. high, affording 18-ft. head, with an adjacent brick power house 120 x 40 ft. Equipment: includes four vertical units, each a 1,200-h.p. turbine direct connected to a 650-k.w., 3-ph., 60-cy., 6,600-v. generator; energy transmitted at the generator voltage to the Trenton transformer station, to be raised to 44,000 v. for transmission. Maximum load on the Frankford plant, 2,620 k.w.; load factor, 30 per cent. Plant installed in 1912. **Campbellford Hydro-electric Plant:** Situated at No. 11 dam of the Trent canal. The dam is 25 ft. high by 2,100 ft. long, partly earth, partly concrete piers with stop-logs; a flume or headrace, 1,200 ft. long and 150 ft. wide, with suitable head works, on the opposite side of the river from the canal lock, leads to a concrete-block power house 110 x 44 ft.; available head, 23 ft. Installation, five vertical units, each of 1,100-h.p. turbine direct connected to a 750-k.v.a., 3-ph., 60-cy., 2,400-v. generator. Station transformers, four 3-ph. units, each of 1,125 k.v.a., stepping the voltage up from 2,400 v. to 44,000 v. Maximum load, 2,900 k.w.; load factor, 65 per cent. Plant installed in 1909. **Healey Fall Hydro-electric Plant:** Situated at No. 14 dam of the Trent canal. The dam is of concrete, 595 ft. long by 45 ft. high, the water being led from the canal through a short forebay and two 12-ft. steel conduits, each 450 ft. long, to the 180 x 70 ft. reinforced concrete and brick power house; available head, 76 ft. Equipment: two 5,600-h.p. turbines, each direct connected to a 3,750-k.v.a., 3-ph., 60-cy., 6,600-v. generator;

a third unit is being installed, while the development is designed for four units. Three 3,750-k.v.a. station transformers step the voltage up to 44,000 v. Maximum load, 7,600 k.w. Slight trouble sometimes experienced from insufficient water. Plant installed in 1913. **Peterborough Hydro-Electric Plant:** Situated at No. 18 dam of the Trent canal on the Otonabee river. The dam is of the stop-log sluice type, with concrete piers 20 ft. apart; it is 24 ft. high by 452 ft. long, including an intake at one end, whence the headrace canal, 80 ft. wide and 1,200 ft. long, leads to an 88 x 35-ft. brick power house; pondage area, 20 acres; available head, 18 ft. Installation: three horizontal units, each of a 950-h.p. turbine direct connected to a 625-k.v.a., 3-ph., 60-cy. generator, one of these being at 2,400-v. for local distribution, and the other two at 6,600 v. Two 3-ph. station transformers, each of 1,875 k.v.a., in a separate building, step the voltage up from 6,600 v. to 44,000 v.; also three 200-k.v.a. single-ph. transformers in the power house may be used to raise the energy from the 2,400-v. generator to 6,600 v. Maximum load, 1,980 k.w.; load factor, 71 per cent. Plant installed in 1912, but a power plant, owned by the Auburn Power Co., had been in existence at the same site for a number of years previously. **Fenelon Falls Hydro-Electric Plant:** Situated at No. 30 dam of the Trent canal. The dam is of concrete piers and stop-log type, 320 ft. long by 16 ft. high, with a headrace 200 ft. long, 40 ft. wide and 9 ft. deep, leading to a brick power house 60 x 45 ft.; available head, 24 ft. Equipment: two 500-h.p. turbines, each direct connected to a 400-k.v.a., 3-ph., 60-cy., 600-v. generator. Six 135-k.w. station transformers step the voltage up to 11,520 v., 3 ph., 60 cy. Maximum load, 760 k.w.; load factor, 40 per cent, the output being sometimes limited by the flow of water. Plant installed in 1896. **Transmission Line:** The transmission system will be better understood from the map facing page 88. Operation is conducted at 44,000 v., 3 ph., 60 cy., the only exception being between Fenelon Falls and Lindsay and between the Frankford and Trenton power plants, where voltages of 11,000 v. and 6,600 v., respectively, are used. The lines usually consist of a single circuit of three No. 0000 aluminum conductors, supported by pin-type insulators on wooden poles. Additional lines will be constructed for the improvement of voltage regulation and the duplication of service to minimize interruptions, while an extension to Kingston has also been completed. The total length of transmission lines on this system, including the Kingston line, is 315 miles. The Kingston line, which has recently been built, is 30 miles in length and operates at 44,000 v., 3 ph., 60 cy. It consists of a single circuit of three No. 0 copper conductors, supported by suspension-type insulators on wooden poles, and is designed to carry 3,000 k.w. with a loss of 10 per cent. Lightning protection, electrolytic arresters and a ground wire over the line. A 44,000-v. line is also being built in connection with this system between Healey Fall and Trenton power plants, 32 miles, to be used as a tie line. The transformer capacity of the various substations served is as follows: Belleville, 2,250 k.v.a.; Bowmanville, 1,500 k.v.a.; Brighton, 300 k.v.a.; Canada Cement Co., Lehigh mill, 3,000 k.v.a.; Canada Cement Co., Belleville mill, 2,250 k.v.a.; Cobourg, 600 k.v.a.; Colborne, 100 k.v.a.; Deloro, 750 k.v.a.; Deseronto, 600 k.v.a.; Kingston, 1,500 k.v.a.; Lindsay, 2,250 k.v.a.; Madoc, 900 k.v.a.; Millbrook, 100 k.v.a.; Napanee, 600 k.v.a.; Newcastle, 100 k.v.a.; Oshawa, 2,250 k.v.a.; Peterborough, 3,600 k.v.a.; Port Hope, 1,050 k.v.a.; Point Ann quarries, 600 k.v.a.; Pulp mill, Campbellford, 2,250 k.v.a.; Sulphide, 780 k.v.a.; Trenton, 1,350 k.v.a.

St. Lawrence System—For this system 475 h.p. at $12 per h.p.-year at 2,200 v. is purchased from Beach Brothers, whose hydro-electric plant at Iroquois (see under Iroquois) derives power from the Galops canal on the St. Lawrence. Energy is transmitted at 2,200 v. to the transformer station, also Iroquois, where three 250-k.v.a. station transformers step the voltage up from 2,200 v. to 26,400 v. **Transmission Lines:** These extend westward 30 mi. to Brockville and north 15 mi. to Winchester, energy being transmitted at 26,400 v. The lines, which cover a total of 60 mi., are valued at $147,465; they consist of a single circuit of three No. 000 aluminium conductors, supported by pin-type insulators on wooden poles, while a portion of 2,200-v. line, 6½ mi. long, may also be included in the transmission system. Lightning protection, electrolytic arresters and a ground wire over the lines. The transformer capacity of the substations served is as follows: Brockville, 600 k.v.a.; Prescott, 450 k.v.a.; Winchester (including Chesterville), 150 k.v.a. Although Morrisburg and North

Williamsburg are within the territory covered by the above system, they are supplied independently from a plant at Morrisburg, which is described under Morrisburg.

Nipissing System.—Situated around the eastern portion of lake Nipissing, extending from North Bay to Nipissing and supplied from a hydro-electric plant on South river, 2½ mi. above Nipissing. **Hydro-Electric Plant:** Diversion dam of concrete pier and stop-log type, 18 ft. high, affording a pondage of 100 acres, whence an open canal, 900 ft. long, followed by a 6-ft. wood-stave pipe, 2,300 ft. long, leads to the brick power house 55 x 41 ft.; available head, 92 ft. The equipment includes two 1,100-h.p. turbines, each direct connected to a 450-k.w., 3-ph., 60-cy., 2,200-v. generator, the voltage being stepped up by three 300-k.w. transformers to 22,000 v. for transmission. Maximum load, 900 h.p.; load factor, 60 per cent. Plant installed in 1910. **Transmission Line:** The 22,000-v. transmission line extends some 20 mi. to North Bay, with a 4-mi. tap to Powassan; it consists of a single circuit of 3 No. 0 aluminium cables supported by pin-type insulators on wooden poles. Lightning protection, electrolytic arresters and horn-gaps, also a grounded steel cable over the line. Nipissing village is supplied directly from the power plant at 2,200 v., while the transformer capacity at the substations supplied is 150 k.v.a. at Powassan, 50 k.v.a. at Callander and 1,350 k.v.a. at North Bay.

ACTON, Halton Co. (1,570*). Supplied from the Niagara system of the Hydro-Electric Power Commission and distributed under municipal control. Energy purchased in block at 2,300 v. at $36 per h.p.-year. Earnings may be divided, 75 per cent for lighting and 25 per cent for power. **Substation:** Equipment: three 75-k.v.a. station transformers step the voltage down from 13,500 v. to 2,200 v., 3 ph., 25 cy. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 25 line transformers, of from 3 k.v.a. to 15 k.v.a. capacity. Number of consumers, 275; connected load, 264 h.p. for lighting and 210 h.p. in motors. Distribution system valued at $10,000. **Rates:** Domestic lighting, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial lighting, from 0·7 cent to 7 cents per k.w.h.; for power, from 0·15 cent to 3·6 cents per k.w.h., plus $1 per h.p. per month; all rates are subject to 10 per cent discount. Street lighting: 90 lamps of 80-c.p. and 60 of 100-c.p., at $117 monthly.

AILSA CRAIG, Middlesex Co. (462*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 75 h.p. being obtained from the Lucan substation at $49.67 per h.p.-year. **Distribution:** 3 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 15 line transformers, of 99 k.v.a. total capacity. Number of consumers, 63; connected load, 56 h.p. for lighting and 85 h.p. in motors. Distribution system valued at $6,204. **Rates:** Domestic lighting rate, from 3·25 to 6·5 cents per k.w.h., plus 3 cents per 100 sq. ft. area per month; commercial lighting rate, from 1·3 to 13 cents per k.w.h.; power rate, from 0·15 cent to 6·1 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street lighting: 100-w. lamps, at $15.50 per lamp per year.

ALEXANDRIA, Glengarry Co. (2,434*). Supplied from a municipal steam plant. **Steam Plant:** Stone building 80 x 30 ft., containing two 100-h.p. return tubular boilers, and one 200-h.p. Corliss engine belted to a 100-k.w., 2-ph., 66-cy., 2,400-v. generator. Maximum load, 98 h.p.; cost of generation, 1 cent per h.p.-hour. Fuel: coal and wood; yearly consumption, 550 tons of coal, at $9, and 380 cords of wood, at $3. Plant operated at night only, installed in 1895, and valued at $47,500. **Distribution:** 5 mi. of streets; primaries at 2,400 v. and secondaries at 110 v.; 20 line transformers, of from ½ k.w. to 2½ k.w. capacity. Number of consumers, 225. **Rates:** Meter lighting rate, 10 cents per k.w.h. Street lighting: 100-w. and 60-w. tungsten lamps, at $12 and $9 per lamp per year.

ALLISTON, Simcoe Co. (1,237*). Supplied by Alliston Electric Light Co., from a combined hydraulic and steam-power plant, hydraulic energy being derived from the Boyne

river. **Power Plant:** The hydraulic development comprises a rock-filled crib and earth dam, 100 ft. long by 17 ft. high, affording 22-ft. head; an adjacent brick power house 42 x 48 ft. Equipment: one 150-h.p. turbine, belted to a 60-k.w., 2-ph., 133-cy., 1,100-v. generator. The steam plant, which is only operated during shortage of water, includes a 150-h.p. boiler at 100 lbs. pressure and one 150-h.p. engine which can operate the generator belted to the water wheel. Fuel: coal and wood; yearly consumption, 100 tons of coal, at $8, and 40 cords of wood, at $3.50. Maximum load, 53 k.w.; night service only. Plant installed in 1901, and valued at $15,000. **Distribution:** 6 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 32 line transformers of from 2 k.w. to 10 k.w. and of 224 k.w. total capacity. Number of consumers, 240; connected load, 125 k.w. System valued at $9,000. **Rates:** Meter rate, 12 cents per k.w.h. Street lighting: 75-w. tungsten lamps, at $17 per lamp per year. The system will soon be under municipal control, using hydro power.

ALMONTE, Lanark Co. (2,631*). Supplied, under municipal control, from a local hydro-electric plant on the Mississippi river. **Hydraulic Plant:** Concrete and wooden dam, 80 ft. long by 2½ ft. high, whence a short wooden flume leads to a wooden penstock, affording 25-ft. head. The stone and frame power house, 35 x 30 ft., with an addition of 20 x 15 ft., contains a 360-h.p. turbine belted to a 250-k.w., 3-ph., 60-cy., 2,250-v. generator. Maximum load, 75 k.w.; cost of generation, $22 per h.p.-year. Conservation reservoirs, under control of Mississippi River Improvement Co., have been constructed on the lakes in the upper reaches of the river. The plant, which gives a continuous service, was installed in 1904, renewed in 1916, and is valued at $20,000. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 17 line transformers, of from 3 k.w. to 20 k.w. capacity. Distribution system valued at $30,000. **Rates:** Meter rate for domestic lighting, from 1½ to 4 cents per k.w.h. plus 3 cents per 100 sq. ft. of floor area per month; for commercial lighting, from 1 cent to 8 cents per k.w.h., according to consumption. Above rates subject to a 10 per cent discount. Street lighting: 150-c.p. and 400-c.p. lamps, at $11 and $21 per lamp per year.

ALTON, Peel Co. Supplied by Cataract Electric Co. (See under Orangeville). Also about 100 h.p. supplied in block from the Eugenia system of the Hydro-Electric Power Commission for industrial purposes.

ALVINSTON, Lambton Co. (706*). Supplied by Alvinston Power Co., from a steam-power plant. **Steam Plant:** Frame building 45 x 50 ft., containing one 80-h.p. boiler and a 40-h.p. engine belted to a 35-k.w., 125-v. and 250-v., d.c. generator, operated on the three-wire system. Fuel: bituminous coal, the consumption being 342 tons yearly at an average of $3.35 per ton. The plant, installed in 1904, gives a night service only. **Distribution:** 3½ mi. of streets, distribution on the three-wire system at 125 v. and 250 v. and supplying 111 consumers. **Rates:** Flat rate, on the basis of 0·5 cent per watt per month. Street lighting: 25 tungsten lamps of 100 w. and about 275 of 60 w., at a total of $61.50 per month.

AMHERSTBURG, Essex Co. (2,190†). Supplied under control of Hydro-Electric Power Commission (Essex County Light and Power Co.). Energy transmitted from steam plant at Sandwich, the system being included under Sandwich, which see.

ANCASTER, Wentworth Co. Supplied from the Dundas system. (See under Dundas).

ARKONA, Lambton Co. (424). Supplied by Rock Glen Power Co., from a hydro-electric plant on Ausable river near the village. **Hydro-Electric Plant:** Development, concrete dam; equipment: two 60-h.p. turbines, belted to one 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Plant installed in 1906, and valued at $10,000. **Distribution:** 2½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of from 1 k.w. to 5 k.w. capacity. Number of consumers, 65. A flour mill takes some 65 h.p., and the streets are also lighted. Distribution system valued at $7,000. **Rates:** Meter rate for lighting, 10 cents per k.w.h., while a special power rate of 6 cents per k.w.h. is also given during certain seasons.

ARNPRIOR, Renfrew Co. (4,013*). Supplied by the Galetta Electric Power and Milling Co. from a hydro-electric plant on the Mississippi river at Galetta, 6 miles distant; Galetta also supplied. **Hydraulic Plant:** Dam of concrete pier and stop-log type 200 ft. long by 10 ft. high, with a concrete open flume 300 ft. long, 30 ft. deep and from 20 to 50 ft. wide, leading to a concrete power house 50 x 30 ft.; available head, 22 ft. Equipment: two 700-h.p. turbines, each direct connected to a 400-k.v.a., 3-ph., 60-cy., 2,300-v. generator. There are two 125-k.w. and three 60-k.w. station transformers, stepping voltage up from 2,200 v. to 10,000 v., 3 ph., 60 cy. Maximum load, 450 k.w. Trouble from shortage of water has been overcome by conservation dams operated by the Mississippi Improvement Co. on Gull, Long, Cross and other lakes, giving 15 sq. mi. of reservoir area some 50 mi. distant from the plant. The conserved water, which is used in late autumn and winter, is of great benefit. Plant installed in 1909, and gives continuous service. **Transmission Line:** Extends from Galetta to Arnprior, 6 mi., and operates at 10,000 v., 3 ph., 60 cy. It consists of a single circuit of three No. 4 copper conductors supported by pin-type insulators on wooden poles. Lightning protection, multigap arresters and a ground wire on every tenth pole. **Substation:** Equipment of Arnprior substation: three 150-k.w. transformers, stepping the voltage down from 10,000 v. to 2,200 v., 3 ph., 60 cy. Substation and equipment valued at $4,500. **Distribution:** Including Galetta, 7½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 66 line transformers, of 214 k.w. total capacity. Number of consumers, 356; connected load, 420 k.w. for lighting, 332 h.p. in motors, and 75 k.w. in appliances. Distribution system valued at $10,550. **Rates:** Meter rate, from 10 to 12 cents per k.w.h., according to consumption, less 10 per cent discount; flat rate for lighting, from 45 to 65 cents per lamp per month, according to number, less 15 per cent discount; flat rate for power, $25 per h.p.-year. Street lighting: 50-c.p. and 100-c.p. lamps at $9 and $18 per lamp per year.

ARTHUR, Wellington Co., (1,003*). Supplied under municipal control, from the Grand Valley substation on the Eugenia system of the Hydro-Electric Power Commission, 125 h.p. being obtained at $46 per h.p.-year. **Distribution:** 3 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 25 line transformers, of 155 k.w. total capacity. Number of consumers, 120; connected load, 25 k.w. for lighting and 100 h.p. in motors. Distribution system valued at $17,000. **Rates:** Meter rate for domestic lighting, from 3 to 6 cents per k.w.h.; for commercial lighting, from 6 to 12 cents per k.w.h. Street lighting: 200-w. lamps, at a charge of $14 per lamp per year.

AURORA, York Co. (2,041†). Supplied under municipal control, being purchased from the Toronto and York Radial Ry., at $25.50 per h.p.-year; energy supplied at 4,400 v., 3 ph., 25 cy., and distributed at the same voltage.

Municipal System—The total output may be divided 25 per cent for lighting, 60 for power, and 15 for street lighting. **Distribution:** 12 mi. of streets; primaries at 4,400 v. and secondaries for power at 550 v. and for lighting at 110 v. and 220 v.; 28 line transformers, of from 3 k.w. to 25 k.w. capacity. Number of consumers, 443, of whom 8 are for power; connected load, 250 k.w. for lighting, 200 k.w. for appliances, and 400 k.w. for motors. **Rates:** Meter rate for lighting, from 2 to 3 cents per k.w.h., with a minimum charge of from 50 cents to $1.00. Meter rate for power, from 0·25 cent to 2·5 cents per k.w.h., plus $1.00 per h.p. per month. Street lighting: 100-w. lamps, at $8.75 per lamp per year.

Toronto and York Radial Railway System—3,000 k.w. obtained from Toronto Power Co. and used mainly by the above company for electric railway, also for lighting and power distribution. Energy is supplied in block by the Toronto and York Radial Ry. to the municipal systems of Aurora, Newmarket and Richmond Hill, while the company operates distribution systems along its line between York Mills and Keswick, with substations at York Mills, Keswick, Bond Lake, Newmarket and Schomberg. Load divided, 3 per cent lighting, 5 per cent power and 92 per cent electric railway. **Transmission Line:** From York Mills to Keswick, 38 mi.; operated at 12,000 v., 3 ph., 25 cy.; transmits 3,000 k.w., with 3 per

cent loss, at 78 per cent power factor, and consists of a single circuit of three No. 00 copper conductors, with pin-type insulators on wooden poles. Lightning protection, electrolytic arresters. **Distribution:** Including all systems under company's direct control, 30 mi. of streets and roads; primaries at 4,000 v. and secondaries at 110 v. to 550 v.; 30 line transformers, of 150 k.w. total capacity. Number of consumers, 230; connected load, 110 k.w. for lighting, 150 h.p. in motors and 150 k.w. in appliances. **Rates:** 3 to 8 cents per k.w.h., with a monthly minimum, less 10 per cent discount.

AYLMER, Elgin Co. (2,119*). Supplied under municipal control, from a steam-power plant. **Steam Plant:** Brick buildings 80 x 75 ft. total area. Equipment: two 150 h.p.-return-tubular boilers, at 125 lbs. pressure, and two 100-h.p. engines, one of which is belted to a 35-light arc machine and the other to a 100-k.w., 60-cy., 1,050-v. generator. Fuel: coal, at $4.33 per ton; yearly consumption, approximately 1,300 tons. The plant, installed in 1897 and renewed in 1909, gives a night service only and is valued at $35,000, including outside distribution system. **Distribution:** 5 mi. of streets; primaries at 1,050 v. and secondaries at 110 v.; 17 line transformers, of 110 k.w. total capacity. Number of consumers, 429. **Rates:** Meter rate, 8½ cents per k.w.h. Street lighting: arc lamps, at $75 per lamp per year.

AYR, Waterloo Co. (780*). Supplied under municipal control, 100 h.p. at $37.40 per h.p.-year, purchased from the Niagara system of the Hydro-Electric Power Commission, at 4,000 v. **Substation:** three 75-k.v.a. station transformers, stepping voltage down from 26,400 v. to both 2,300 v. and 4,000 v., the units being Y connected. Load divided, 45 h.p. for lighting, 50 h.p. for power, and 10 h.p. for street lighting. **Distribution:** 4 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 98 k.v.a. total capacity. Number of consumers, 130; value, $12,000. **Rates:** Domestic lighting, from 2½ to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial rate, from 1 cent to 10 cents per k.w.h.; for power, from 0·15 cent to 4·5 cents, plus $1 per h.p. per month, all the above being subject to 10 per cent discount. Street lighting: 100-w. lamps at $14 per lamp per year.

AYTON, Grey Co. Supplied to a few consumers by the Wenger Milling Co., from a small water-power plant connected with the latter's mill. The plant has a capacity of 10 k.w. only.

BADEN, Waterloo Co. (576†). Supplied under municipal control, 200 h.p. being obtained from the Niagara system of the Hydro-Electric Power Commission, at $32 per h.p.-year. St. Agatha and Petersburg supplied from the same system. **Substation:** Three 150-k.w. station transformers step the voltage down from 13,200 v. to 4,000 v. **Distribution:** 3 mi. of streets or roads; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 6 line transformers, of 35 k.w. total capacity. Number of consumers, 89; connected load, 90 h.p. for lighting and 300 h.p. in motors. Distribution system valued at $7,191. **Rates:** Domestic lighting rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 3·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street lighting: 100-w. lamps, at $11 per lamp per year.

BANCROFT, Hastings Co. (541*). Supplied by Chas. W. Mullett, from a water-power plant on York river. **Water Power Plant:** Wooden dam, 150 ft. long by 10 ft. high, with a 5 x 8-ft. flume 300 ft. long leading to a frame power house 24 x 30 ft.; available head, 18 ft. Equipment: one 75-h.p. turbine, belted to a 40-k.w., 125-v., d.c. generator. Maximum load, full capacity of the plant; night service only. Plant installed in 1912, and valued at $6,090. **Distribution:** 5 mi. of streets, distribution being at 125 v. d.c. **Rates:** Flat rate, 30 cents per month per 16-c.p. lamp. Street lighting: 32-c.p. lamps at $8 per lamp per year.

BARRIE, Simcoe Co. (6,866*). Supplied under municipal control, 595 h.p. at 25,000 v., at $33.70 per h.p.-year, being obtained from the Severn system of the Hydro-Electric Power

Commission. **Substation:** Two 350-k.v.a. station transformers step the voltage down from 25,000 v., 3 ph., to 2,300 v., 2 ph. Output divided, 53 per cent for lighting, 30 for power, and 17 for street lighting. **Distribution:** 40 mi. of streets; primaries at 2,200 v. and secondaries at 220 v. and 110 v.; 75 line transformers, of from 5 k.w. to 20 k.w. capacity. Number of consumers, 1,153; connected load, 400 h.p. in motors alone. Value of system, $19,686.76, including substation equipment. **Rates:** Domestic lighting, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial lighting, from 0·6 cent to 6 cents per k.w.h.; for power, from 0·15 cent to 3·6 cents per k.w.h., plus $1 per h.p. per month, all rates being subject to 10 per cent discount. Street lighting: 100-w. nitrogen lamps, at $10 per lamp per year.

BEACHVILLE, Oxford Co. Supplied under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 188 h.p. being obtained at $28 per h.p.-year at 2,300 v. **Substation:** Three 75-k.w. station transformers step voltage down from 13,200 v. to 2,300 v., 3 ph., 25 cy. Earnings may be divided, 13 per cent lighting and 87 per cent power. **Distribution:** 2 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 15 line transformers, of 264 k.w. total capacity. Number of consumers, 57; connected load, 42 h.p. for lighting and 350 h.p. in motors. Distribution system valued at $9,859. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h. plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 2·3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

BEAMSVILLE, Lincoln Co. (1,116†). Supplied by Dominion Power and Transmission Co. (See under Hamilton). **Distribution:** 5 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 49 line transformers, of from 0·6 k.w. to 20 k.w. **Rates:** Domestic, 5 cents per k.w.h., or 2 cents per k.w.h. plus 50 cents and upward monthly fixed charge; commercial, 0·15 cent to 6 cents per k.w.h. All rates subject to monthly minimum. Street lighting: 60-c.p. to 100-c.p. tungsten and nitro lamps, at $10 per lamp per year.

BEAVERTON, Ontario Co. (1,015). Supplied under municipal control, 58 h.p. being obtained from the Wasdell system of the Hydro-Electric Power Commission at $41.20 per h.p.-year at 4,000 v. **Substation:** Three 100-k.v.a. station transformers step voltage down from 25,000 v. to 4,000 v., 3 ph., 60 cy. **Distribution:** 6 mi. of streets, with primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 21 line transformers, having 77 k.w. total capacity. Number of consumers, 210; connected load, 42 k.w. for lighting and 58 h.p. in motors. Distribution system valued at $15,000. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0.8 cent to 8 cents per k.w.h.; power rate, from 0·3 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $13 per lamp per year.

BEETON, Simcoe Co. (614†). Supplied from a municipal steam power plant. The system will soon be supplied from the Severn system of the Hydro-Electric Power Commission under municipal control. **Steam Plant:** Brick building 30 x 30 ft., containing a 100-h.p. return-tubular boiler at 100 lbs. pressure and a 65-h.p. engine belted to a 25-k.w., single-ph., 60-cy., 1,100-v. generator. Maximum load, 25 k.w. Fuel: bituminous lump coal, 350 tons yearly, at $8.50 per ton. The plant gives night service only; was installed in 1897 and is valued at $6,000, including distribution system. **Distribution:** One mi. of streets; primaries at 1,100 v. and secondaries at 115 v.; 18 line transformers, of 28 k.w. total capacity. Number of consumers, 75; connected load, 40 k.w. for lighting. **Rates:** Meter rate, 11 cents per k.w.h. Street lighting: 32-c.p. lamps.

BELLEVILLE, Hastings Co. (12,006†). Supplied under municipal control, from the Central Ontario system of the Hydro-Electric Power Commission, 1,800 h.p. being taken.

Substation: Three 750-k.v.a. station transformers step the voltage down from 44,000 v. to 2,400 v., 3 ph., 60 cy.; output divided, 58 per cent for lighting, 30 per cent for power and 12 per cent for electro-chemical or metallurgical purposes. **Distribution:** 40 mi. of streets, 1½ mi. being underground; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 195 line transformers, of 2,240 k.w. total capacity. Number of consumers, 2,023; connected load, 2,078 k.w. for lighting and 1,200 h.p. in motors. **Rates:** Domestic lighting rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·167 cent to 2·11 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates subject to 10 per cent discount, with an additional 10 per cent for power. Street lighting: 100-c.p. and 1,000-c.p. lamps, the respective charges being at $10 and $56.15 per lamp per year.

BLENHEIM, Kent Co. (1,443†). Supplied under municipal control, being obtained at 26,400 v. at $43.70 per h.p.-year from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 75-k.w. station transformers step the voltage down from 26,400 v. to 2,300 v., 3 ph., 25 cy. Load may be divided, 55 h.p. for lighting and 20 h.p. for street lighting. **Distribution:** 8½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 10 line transformers, of from 3 k.w. to 10 k.w. Number of consumers, 300; connected load, 142 k.w. **Rates:** Domestic lighting, 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, 10 cents per k.w.h.; all the above subject to 10 per cent discount. Street lighting: 150-w. nitrogen-filled lamps, at $15.50 per lamp per year.

BLIND RIVER, Algoma Dist. (1,526*). Supplied by F. Deagle from a hydro-electric plant on Blind river, 8 miles north of town. **Hydro-electric Plant:** Timber dam, 200 ft. long by 25 ft. high, with a 39-in. steel conduit 312 ft. long, leading to a stone power house 22 x 27 ft.; available head, 60 ft. Equipment: one 250-h.p. turbine, direct connected to a 250-k.v.a., 3-ph., 60-cy., 2,400-v. generator. Maximum load, 125 h.p.; continuous service when required by the power load; otherwise, night only. Plant installed in 1912. **Distribution:** Directly from power plant at 2,200 v., 11 mi. of streets or roads, including the supply line, of 8 mi.; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 5 line transformers, of 200 k.w. total capacity. Number of consumers, 140; connected load, 60 k.w. for lighting and 105 h.p. in motors. **Rates:** Monthly flat rate for lighting, 32 cents per 16-c.p. lamp; power rate, $20 per h.p.-year. Street lighting: 80-w. tungsten lamps, at $25 per lamp per year.

BLYTH, Huron Co. (665†). Supplied under municipal control, from a steam-power plant. **Steam Plant:** Brick building, contains two 80-h.p. return-tubular boilers at 92 lbs. pressure, and a 45-h.p. engine belted to a 30-k.w., single-ph., 33-cy., 1,040-v. generator. Output divided, 22 k.w. for lighting and 4 k.w. for street lighting. Fuel: 220 tons of coal, at $7.35 per ton, also wood and saw-dust of a value of $100 yearly. The plant gives a night service only, was installed in 1911, and is valued at $5,000. **Distribution:** 2½ mi. of streets; primaries at 1,040 v. and secondaries at 104 v.; 11 line transformers of from 1 k.w. to 5 k.w. capacity; connected lighting load, 47 k.w. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting: 60-w. tungsten lamps.

BOBCAYGEON, Victoria Co. (1,000). Supplied by the municipality from a hydro-electric plant on Little Bob river, one mile distant. **Hydraulic Plant:** Concrete dam, 115 ft. long by 17 ft. high, built by the Dominion Government. A concrete penstock 18 x 25 ft. leads to the power plant contained in two buildings one of corrugated iron 18 x 34 ft., and another of concrete blocks 20 x 38 ft. Equipment: two 100-h.p. turbines, operating under a 6-ft. head, belted to a 100-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 64 k.w.; night service only. Plant installed in 1906, destroyed by fire and rebuilt in 1912; present valuation, $10,000. **Distribution:** 6½ mi. of streets; primaries at 2,200 v. and secondaries at 110; v. 27 line transformers, of from 1 k.w. to 5 k.w. capacity. Number of consumers, 265; connected load, 50 k.w. for lighting, 4½ k.w. for motors, and 23 k.w. for appliances. Distribution system valued at $13,000. **Rates:** Flat rate for lighting, $2 per 16-c.p. lamp

per year; for power, $10 per h.p.-year. Street lighting: 12 arc lamps, 10 lamps of 100 c.p. and 43 of 80-c.p., at a total of $900 per year.

BOLTON, Peel Co. (628†). Supplied under commission control, from the Niagara system of the Hydro-Electric Power Commission; 100 h.p. being taken from the Woodbridge sub-station at $43 per h.p.-year. **Distribution:** 3·6 mi. of streets; primaries at 4,000 v. and 2,200 v and secondaries at 110 v. and 220 v.; 17 line transformers, of 149 k.v.a. total capacity. Number of consumers, 110; connected load, 119 h.p. for lighting and 115 h.p. in motors. Distribution system valued at $13,183. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 4·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps at $14 per lamp per year.

BOTHWELL, Kent Co. (735†). Supplied under municipal control, from the Niagara system of the Hydro-Electric Power Commission; 150 h.p. being contracted for at $59.26 per h.p.-year. **Substation:** Three 75-k.v.a. station transformers step voltage down from 26,400 v. to 4,000 v., 3 ph., 25 cy. Average monthly demand, 44½ h.p. **Distribution:** 11½ mi. of streets; primaries at 4,000 v. and 2,300 v. and secondaries at 110 v. and 220 v.; 11 line transformers, of 47 k.w. total capacity. Number of consumers, 148; connected power load alone, 45 h.p. in motors. Distribution system valued at $5,000. **Rates:** Meter rate for domestic lighting, 7½ cents per k.w.h.; commercial, 15 cents per k.w.h.; power rate, $60 per h.p.-year. Street lighting: 100-w. lamps at $15.50 per lamp per year.

BOWMANVILLE, Durham Co. (3,545†). Supplied under commission control, from the Central Ontario system of the Hydro-Electric Power Commission, 1,247 h.p. being taken. **Substation:** Two 750-k.v.a. station transformers step the voltage down from 44,000 v. to 2,400 v., 3 ph., 60 cy.; output divided, 35 per cent for lighting and 65 per cent for power. **Distribution:** 20 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 57 line transformers, of 1,174 k.w. total capacity. Number of consumers, 673; connected load, 1,409 k.w. for lighting and 1,864 h.p. in motors. **Rates:** Domestic lighting rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·167 cent to 2·33 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates are subject to 10 per cent discount with an additional discount of 10 per cent for power. Street lighting: 80-c.p. lamps, at $11 per lamp per year.

BRACEBRIDGE, Muskoka Dist. (2,506*). Supplied. under municipal control, from two local hydro-electric plants on the Muskoka river; a third hydraulic plant is used for water-works. **Hydro-electric Plants:** The development utilizes three successive falls on the Muskoka river with a separate power house at each step. It includes two concrete dams, 500 and 105 ft. long, respectively, and two of timber 200 and 90 ft. long, respectively, varying in height from 5 to 12 ft. No. 1 plant: turbines of 215 h.p. total capacity for pumping, under 14-ft. head. No. 2 plant: 36-ft. head; stone building 35 x 50 ft.; one 450-h.p. and one 360-h.p. turbine, direct connected, respectively, to a 300-k.w. and a 250-k.w. generator. No. 3 plant: at Wilson fall; brick building 32 x 45 ft.; 42-ft. head. Equipment: one 900-h.p. turbine, direct connected to a 600-k.w. generator; energy generated at 2 ph., 60 cy., 2,200 v.; maximum load, practically the total installed capacity. Plants give a continuous service, are valued at $125,000, and the first one has been in operation since 1895. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 103 line transformers, of 766 k.w. total capacity, 22 of these being privately owned. Number of consumers, 331; connected load, 500 k.w. for lighting and 1,400 h.p. in motors. Distribution system valued at $50,000. **Rates:** Average flat rate, $2 per 16-c.p. lamp per year; power rate, from $12.50 to $15 per h.p.-year, according to restrictions. Street lighting: 100-c.p. nitro lamps, at $10 per lamp per year.

BRAMPTON, Peel Co. (4,024†). Supplied under municipal control, from the Niagara system of the Hydro-Electric Power Commission, a block of 750 h.p. at 13,200 v. being purchased at $22 per h.p.-year. **Substation:** Three 300-k.v.a. station transformers step the voltage down from 13,200 v. to 2,200 v., 3 ph., 25 cy. **Distribution:** 20 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 75 line transformers, of 1,300 k.w. total capacity. Number of consumers, 950; connected load, 450 k.w. for lighting and 890 h.p. in motors. Distribution system valued at $84,152. **Rates:** Domestic lighting, from 1 cent to 2 cents per k.w.h. according to consumption, plus 3 cents per 100 sq. ft. of floor area per month; commercial rate, from 0·5 cent to 5 cents per k.w.h., according to consumption; for power, from 0·167 cent to 2·33 cents per k.w.h., according to consumption, plus a monthly service charge of $1 per h.p.; all these rates are subject to 10 per cent discount, with an additional discount of 10 per cent for power. Street lighting: 100-w. tungsten lamps, at $7.50 per lamp per year.

BRANTFORD, Brant Co. (27,664†). Supplied from two sources, one under municipal control and the other, the Dominion Power and Transmission Co.

Municipal System Energy obtained from the Niagara system of the Hydro-Electric Power Commission at 26,400 v., at $19 per h.p.-year. **Substation:** Four 750-k.v.a. station transformers step the voltage down from 26,400 v. to 4,000 v., 3 ph., 25 cy.; also two 200-k.w. motor generator units for railway purposes. Maximum load, 2,708 h.p., divided, 19 per cent for lighting, 36 for power, 14 for street lighting, and 31 for railway purposes, giving an annual load factor of 54·5 per cent. Substation and equipment valued at $59,036. **Distribution:** 90 mi. of streets, with ¾ mi. underground; primaries at 4,000 v. and secondaries for lighting at 110 v. and 220 v., and for power at 220 v. and 550 v.; 105 line transformers, of from 2 k.w. to 125 k.w. capacity. Number of consumers, 2,959; connected load, 595 k.w. for lighting, and 2,155 h.p. for power. Estimated value of the system, approximately $230,000. **Rates:** Domestic lighting, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial lighting, from 0·15 cent to 4·5 cents per k.w.h.; for power, from 0·15 cent to 1·67 cents per k.w.h., plus $1 per h.p. per month, all rates being subject to 10 per cent discount, with 10 per cent additional discount for power. Street lighting: magnetite arc and 100-w. tungsten lamps, at $40 and $7.50 per lamp per year.

Dominion Power and Transmission Co.—This system obtains energy from a local hydro-electric plant and from the company's Power Glen hydro-electric and Hamilton steam plants. (See under Hamilton). **Distribution:** 30 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 379 line transformers, of from 0·5 k.w. to 100 k.w. capacity.

BRECHIN, Ontario Co. Supplied under commission control from the Wasdell system of the Hydro-Electric Power Commission; 40 h.p. at 4,000 v., at $50 per h.p.-year, being taken from the Beaverton substation. Earnings from the various services may be divided, 35 per cent for lighting, 57 for power and 8 for miscellaneous. **Distribution:** 2½ mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 7 line transformers, of 60 k.w. total capacity. Number of consumers, 37; connected load, 20 k.w. for lighting and 35 h.p. in motors. Distribution system valued at $2,298. **Rates:** Domestic, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1·2 to 12 cents per k.w.h.; power rate, from 0·3 cent to 4·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates subject to 10 per cent discount. Street lighting: 100-w. lamps at $13 per lamp per year.

BRESLAU, Waterloo Co. Supplied under commission control, from the Niagara system of the Hydro-Electric Power Commission, 40 h.p. being taken from Preston substation at 4,000 v. **Distribution:** Including supply line, 6½ mi. of streets or roads; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 20 line transformers, of 97 k.w. total capacity. Number of consumers, 18; connected load, 20 h.p. for lighting and 80 h.p. in

motors. **Rates:** Lighting rate, 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; power rate, from 0·75 cent to 4 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.

BRIDGEBURG, Welland Co. (2,119†). Supplied from the Fort Erie system. See under Fort Erie.

BRIGDEN, Lambton Co. (448†). Supplied from Niagara system of Hydro-Electric Power Commission, and but recently added.

BRIGHTON, Northumberland Co. (1,278*). Supplied under commission control, from the Central Ontario system of the Hydro-Electric Power Commission, 90 h.p. being taken. **Substation:** Three 100-k.v.a. station transformers step the voltage down from 44,000 v. to 2,400 v.; load divided, 80 per cent for lighting and 20 for power. **Distribution:** 20 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 34 line transformers, of 175 k.w. total capacity. Number of consumers, 353; connected load, 450 k.w. for lighting and 80 h.p. in motors. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate from 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates subject to 10 per cent discount. Street lighting: 80-c.p. lamps at $10 per lamp per year.

BROCKVILLE, Leeds Co. (9,547†). Supplied under municipal control, from the St. Lawrence system of the Hydro-Electric Power Commission, at $30 per h.p.-year, at 26,500 v. The municipality also has a steam auxiliary plant. **Steam Plant:** Three water-tube boilers, two of 350 h.p. and one of 150 h.p. capacity at 150 lbs. pressure; three engines, two of 480 h.p. each and one of 160 h.p., direct connected, respectively, to two 340-k.w. and one 120-k.w., 3-ph., 60-cy., 2,200-v. generators. When in operation, cost of generation is 2·52 cents per k.w.h. Plant installed in 1914, and valued at $77,720. **Substation:** Three 200-k.v.a. station transformers step the voltage down from 26,500 v. to 2,200 v., 3 ph., 60 cy.; 291 h.p. is taken, divided, 35 per cent for lighting, 38 for power and 27 for street lighting. **Distribution:** 17 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 53 line transformers, of from 2 k.w. to 5 k.w. capacity. Number of consumers, 1,176. Distribution system valued at $33,500. **Rates:** Meter rate for lighting, 10 cents per k.w.h.; for power, from 2 to 4½ cents per k.w.h., plus $1 per h.p. per month; for appliances, 4 cents per k.w.h.; all prices net. Street lighting: 100-w. and 60-w. tungsten lamps, at $14 per 100-w. lamp per year.

BRUCE MINES, Algoma Dist. (742*). Supplied under municipal control, from a steam power plant. **Power Plant:** Cement-block building in two portions, 40 x 30 ft. and 30 x 50 ft. Equipment: one 80-h.p. return-tubular boiler at 100 lbs. pressure and one 50-h.p. engine, belted to a 45-k.w., single-ph., 133-cy., 2,300-v. generator. Maximum load, 35 h.p. Fuel: 400 tons of coal yearly, at $8.50. The plant, which gives a night service only, was installed in 1915 and is valued at $3,500. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 20 line transformers, of 80 k.w. total capacity. Number of consumers, 60. Distribution system valued at $3,000. **Rates:** Meter rate, 15 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $15 per lamp per year.

BRUSSELS, Huron Co. (902). Supplied under municipal control, from a privately owned steam plant operated by municipality. **Steam Plant:** Brick building 30 x 40 ft., contains one 75-h.p. return-tubular boiler at 100 lbs. pressure, and one 100-h.p. engine belted to a 100-k.w., 2-ph., 60-cy., 220-v. generator. Maximum demand, 60 k.w. Fuel: bituminous coal, 300 tons yearly, at $6 per ton. The plant, which gives a night service only, was installed in 1901, and, including the distribution, is valued at $6,000. **Distribution:** 6 mi. of streets or roads, at 220 v. Number of consumers, 100; connected load, 1,800 lamps. **Rates:** 10 cents per k.w.h. Street lighting: 100-w. lamps, at $15 per lamp per year.

BURFORD, Brant Co. Supplied under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 31 h.p. being obtained at $37.50 per h.p.-year, at 4,000 v. **Substation:** Three 75-k.w. station transformers step the voltage down from 26,400 v. to 4,000 v., 3 ph., 25 cy. Earnings may be divided, 75 per cent for ligh ing and 25 for power. **Distribution:** 2¼ mi. of streets; primaries at 4,000 v. and 2,300 v. and secondaries at 110 v. and 220 v.; 7 line transformers, of 37 k.w. total capacity. Number of consumers, 95; connected load, 125 h.p. for lighting and 30 h.p. in motors. Distribution system valued at $6,343. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.: power rate, from 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $13 per lamp per year.

BURGESSVILLE, Oxford Co. Supplied under commission control, from the Niagara system of the Hydro-Electric Power Commission, 30 h.p. being obtained from the Norwich substation at 2,300 v., at a cost of $50 per h.p-year. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 40 k.w. total capacity. Number of consumers, 40; connected load, 28 h.p. for lighting and 30 h.p. in motors. Distribution system valued at $3,500. **Rates:** Lighting rate, 5½ cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; flat rate for lighting, 50 cents per 100-w. lamp per month; power rate, from 1·5 to 4·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. Street lighting: 100-w. tungsten lamps.

BURKS FALLS, Parry Sound Dist. (1,008†). Supplied by Knight Bros. Co., from a hydro-electric plant in the town on the Maganetawan river and operated in connection with their factory; total water-power used, approximately 270 h.p. **Hydraulic Plant:** Development also used for other factory operations. Timber dam, 105 ft. long by 20 ft. high, with a timber flume 450 ft. long and 7 ft. wide, leading to the power plant; available head, 27 ft. Brick dynamo room 30 x 30 ft. Equipment: one 120-h.p. turbine, belted to two 60-k.w., single-ph., 125-cy., 1,100-v. generators. There is also a 150-k.w., 550-v., d.c. gene ator, but this is not being used. Maximum load, 70 k.w.; night service only. Slight trouble is sometimes experienced in March from shortage of water and ice. Plant installed in 1904, but there had been a smaller plant in operation previously. **Distribution:** 3 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 15 line transformers, of 45 k.w. total capacity. Number of consumers, 300; connected load, 90 k.w. for lighting and 12 k.w. in appliances. **Rates:** Flat rate, 0·6 cent per watt per month; meter rate, 8 cents per k.w.h., with a meter rental. Street lighting: 40-w. and 60-w. lamps.

BURLINGTON, Halton Co. (2,530†). Supplied by Dominion Power and Transmission Co.'s system. (See under Hamilton.) Distribution also includes Plains Road. **Distribution:** 18 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 179 line transformers, ranging from 0·6 k.w. to 50 k.w. capacity.

BURRITTS RAPIDS, Grenville Co. Supplied by the Kemptville Milling Co. (See under Kemptville).

CACHE BAY, Nipissing Co. (965*). Supplied by Northern Ontario Light and Power Co. See Sturgeon Falls.

CALABOGIE, Renfrew Co. Supplied from hydro-electric plant of M. J. O'Brien, Ltd., on Madawaska river in village. Plant also supplies energy to Renfrew and Mount St. Patrick. **Hydro-electric Plant:** Concrete dam, 35 ft. high and 400 ft. long. Head utilized, 30 ft. Concrete and brick power house; contains three 3,000-h.p. turbines, each direct connected to a 2,200-k.v.a., 3-ph., 60-cy., 6,600-v. generator.

CALEDONIA, Haldimand Co. (1,201†). Supplied under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 55 h.p. being obtained at $24 per

h.p.-year at 2,200 v. The Commission also supplies power direct for industrial purposes **Substation:** Three 150-k.w. station transformers step the voltage down from 13,200 v. to 2,200 v., 3 ph., 25 cy. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 6 line transformers, of 22 k.w. total capacity. Number of consumers, 67; connected load, 90 h.p. for lighting and 60 h.p. in motors. Distribution system valued at $7,310. **Rates:** Domestic lighting rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, 0·6 cent to 6 cents per k.w.h.; power rate, from 0·15 cent to 2·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

CALLANDER, Parry Sound Dist. Supplied under public control, from the Nipissing system of the Hydro-Electric Power Commission, 25 h.p. being obtained. **Substation:** One 50-k.v.a. station transformer steps the voltage down from 22,000 v. to 2,200 v., 60 cy. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 7 line transformers, of 38 k.w. total capacity. Number of consumers, 101; connected load of 20 k.w. for lighting and 15 h.p. in motors. **Rates:** Meter rate, 10 cents per k.w.h., less 20 per cent discount. Street lighting: 100-w. lamps at $20 per lamp per year.

CAMDEN EAST, Lennox and Addington Co. Supplied under commission control from Central Ontario system of the Hydro-Electric Power Commission, 295 h.p. being taken from the Napanee substation at 4,000 v., 3 ph., 60 cy.; output divided, 14 per cent for lighting and 86 per cent for power. The system also includes Newburg. **Distribution:** 11½ mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 20 line transformers, of 437 k.w. total capacity. Number of consumers, 90; connected load, 45 k.w. for lighting and 400 h.p. in motors. **Rates:** Domestic lighting rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $15 per lamp per year.

CAMPBELLFORD, Northumberland Co. (3,051). Supplied under municipal control, from a local hydro-electric plant on the Trent river. **Hydro-Electric Plant:** Situated at No. 12 dam of the Trent canal; concrete dam, 520 ft. long by 20 ft. high; a race-way 600 ft. long, 50 ft. wide and 11 ft. deep, leads from the canal to a concrete and stone power house 34 x 65 ft.; available head, 25 ft. Equipment: two turbines, of 1,400 h.p. and 1,900 h.p., direct connected, respectively, to a 750-k.w. and a 1,250-k.w., 3-ph., 60-cy., 2,400-v.generator. Maximum load, 1,950 h.p., of which 1,275 h.p. is supplied to the Central Ontario system of the Hydro-Electric Power Commission, the remainder being used for the local system supplying the town. The plant, which gives a continuous service, was installed in 1909, and is valued at $200,000. **Distribution:** 20 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. and 220 v.; 56 line transformers, of 730 k.w. total capacity. Number of consumers, 800; connected load, 350 k.w. for lighting and 533 h.p. in motors. **Rates:** Yearly flat rate, $1 per 25-w. lamp; power rate, $15 per h.p.-year. Street lighting: arc and 100-w. lamps, at $40 and $5 per lamp per year.

Campbellford Pulp Mill—Electric energy to operate the Campbellford pulp mill is supplied from the Central Ontario system of the Hydro-Electric Power Commission; 2,400 h.p. being required. **Substation:** The substation for the mill is equipped with two 1,125-k.v.a. station transformers, stepping the voltage down from 44,000 v. to 2,400 v.; a portion also stepped down from 2,400 v. to 210 v.

CAMP BORDEN, Simcoe Co. Supplied from Severn system of Hydro-Electric Power Commission. **Substation:** Three 125-k.w. transformers step voltage from 22,000 v. to 2,200 v. at 3 ph., 60 cy.

CANNINGTON, Ontario Co. (775†). Supplied under municipal control from the Wasdell system of the Hydro-Electric Power Commission, approximately 60 h.p. being purchased at

$47.50 per h.p.-year. **Substation:** Three 100-k.v.a. station transformers step the voltage down from 25,000 v. to 2,200 v., 3 ph., 60 cy. Load divided, 60 per cent for lighting and 40 for power. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 13 line transformers, of 125 k.w. total capacity. Number of consumers, 225; connected load, 70 k.w. for lighting and 60 h.p. in motors. **Rates:** Domestic lighting rate, 4 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial rate, from 4 to 8 cents per k.w.h., according to consumption; power rate from 0·3 cent to 3·6 cents per k.w.h., according to consumption, plus a monthly service charge of $1 per h.p.; all rates subject to 10 per cent discount with an additional 10 per cent discount for power. Street lighting: 100-w. lamps, at $12 per lamp per year.

CARDINAL, Grenville Co. (1,184†). Supplied by the Cardinal Electric Light Co., which acts as a distributing company for the Canada Starch Co.; the latter operates a steam power plant in connection with other portions of its works, steam being supplied from a bank of boilers. **Steam Plant:** Brick building, 69 x 49 ft., containing two 275-h.p. engines, each belted to a 125-k.v.a., 60-cy., 240-v. generator. Maximum load supplied outside, 100 h.p. Fuel: slack coal. Plant was installed in 1908, and is valued at $6,600. **Distribution:** 1½ mi. of streets, at the generator voltage of 240 v. Number of consumers, 110; connected load, 68 k.w. for lighting and 10 h.p. in motors. **Rates:** Meter rate, 7 cents per k.w.h.; monthly flat rate, $1 per 6 lights. Street lighting: 16-c.p. lamps, at $5 per lamp per year.

CARGILL, Bruce Co. Supplied by Cargill, Ltd., from a water-power plant on the Teeswater river. **Water Power Plant:** Concrete dam, from 10 to 20 ft. high by 300 ft. long, with concrete flumes and wooden penstocks leading to a concrete power house 20 x 30 ft., where a normal head of 16 ft. is available. Equipment: 4 turbines, 3 of which are used for other purposes, while one of 100-h.p. capacity is geared and belted to an 85-k.w., 220-v., d.c. generator. Maximum demand, 45 k.w.; night service only. Shortage of water sometimes experienced during the dry season. Present plant installed in 1910, but a plant had been in operation since 1898; total value, including outside system of distribution, $11,000. **Distribution:** 2 mi. of streets, distribution being at 220 v. and 110 v., 3 wire. Number of consumers, 55. Incandescent lamps are used for street lighting, this service being gratuitous.

CARLETON PLACE, Lanark Co. (3,706†). Supplied by H. Brown & Sons from a hydro-electric plant on the Mississippi river. **Hydraulic Plant:** Dam 400 ft. long and from 3 ft. to 12 ft. high; four penstocks, each 14½ ft. wide and 24 ft. long; head used, 11 ft. Cement-brick and concrete power house, 75 ft. x 60 ft., contains three 280-h.p. turbines, two of which are belted to a 250-k.w., and the other to a 150-k.w. generator, the generators being 3 ph., 60 cy., 2,200 v. Maximum load, 600 h.p.; cost of generation, $22 per h.p.-year. The dam affords a pondage of approximately 10 sq. mi., while three lakes in the upper waters have storage dams, which are controlled by the Mississippi River Improvement Co., and no shortage of water has been felt for the past five years. Other lakes are controlled by a lumber company and private owners. The plant gives a continuous service and is valued at $105,000. **Distribution:** 13½ mi. of streets served by the system, 4½ mi. of which are not directly controlled by the supply company; primaries at 2,200 v. and secondaries at 110 v. to 550 v; 78 line transformers, aggregating 560 k.w. capacity; connected load, 300 h.p. for lighting and 530 h.p. for power. **Rates:** Meter rate, 6 cents per k.w.h., plus meter rental, or 3·5 cents per k.w.h., plus a meter rental and fixed charge of 2 cents per month per 100 sq. ft. of area; flat rate, from 5 to 10 cents per 16-c.p. lamp per week, according to number; flat rate for power, from $21 to $33 per h.p. per year, according to amount and service; power meter rate, from 1·5 to 2 cents per k.w.h., plus a fixed charge of $10 per h.p. per year. Street lighting: 40-w. tungsten lamps, at $6 per lamp per year.

CARLSRUHE, Bruce Co. Supplied from the Hanover system. (See under Hanover).

CASSELMAN, Russell Co. (976†). Supplied by J. N. Coupal from a local hydro-electric plant on Nation river operated in connection with flour and saw mill. **Development:** Concrete dam, 350 ft. long by 7 ft. high, with a concrete flume 30 ft. wide, 10 ft. deep and 150 ft. long, leading to a concrete and brick power house, 30 x 40 ft., where the head is 35 ft. Equipment: one 500-h.p. turbine operating a 300-k.w., 3-ph., 60-cy., 2,300-v. generator. Service from 7 a.m. to 12 p.m. Shortage of water sometimes limits operation of plant to 6 or 7 months in the year. Installed 1911. **Distribution:** 2 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 6 line transformers, of 30 k.w. total capacity. Number of consumers, 40; connected load, 25 k.w. for lighting and 125 h.p. in motors, the latter to operate mill. **Rates:** Monthly flat rate, 15 to 20 cents per lamp, according to number. Street lighting: 60-w. lamps, at $15 per lamp per year.

CATARACT, Peel Co. Supplied by the Cataract Electric Co. (See under Orangeville).

CHAPLEAU, Sudbury Dist. (1,733*). Supplied by Chapleau Electric Light and Power Co., from a hydro-electric plant on the Kebsquashesi river within the township. **Hydro-Electric Plant:** A reserve timber dam, 215 ft. long by 18 ft. high, and a timber power dam, 125 ft. long by 25 ft. high. From the latter, a 6 x 6-ft. wooden flume 300 ft. ong leads to a frame power house, 30 x 30 ft.; available head, 28 ft. Equipment: one 400-h.p. turbine, belted to a 200-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 100 h.p. The plant, which was installed in 1909 and is valued at $40,000, gives a continuous service. **Distribution:** 5 mi. of streets or roads; primaries at 2,300 v. and secondaries at 110 v.; 21 line transformers, of 175 k.w. total capacity. Number of consumers, 343; connected load, 150 k.w. for lighting. Distribution system valued at $9,000. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting: 100-w. and 200-w. lamps, at $20 per 100-w. per year.

CHARLTON, Nipissing Dist. Supplied by Northern Ontario Light and Power Co. (See under Englehart.)

CHATHAM, Kent Co. (13,943†). Supplied from two sources, one of which is under municipal control, 1,000 h.p. being obtained from the Niagara system of the Hydro-Electric Power Commission, at $30.78 per h.p.-year. Also supplied from the Chatham Gas Co.

Municipal System—Substation: Two 750-k.v.a. station transformers step the voltage down from 26,000 v. to 2,200 v. **Distribution:** 25 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 120 line transformers, of 1,500 k.v.a. total capacity. Number of consumers, 1,600; connected load, 2,000 k.w. for lighting and 1,700 h.p. in motors. Distribution system valued at $148,526. **Rates:** Domestic lighting rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 3·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 to 33⅓ per cent, for power, depending upon restrictions, while the various consumption charges vary with the amount used. Street lighting: 100-w. to 500-w. nitro lamps, at $12 and $38, respectively, per lamp per year.

Chatham Gas Company—Energy generated from a combined steam and gas engine plant. **Power Plant:** Brick building, 257 x 200 ft. Equipment: three 150-h.p. return-tubular boilers, at 125 lbs. pressure, and one 400-h.p. engine, direct connected to a 275-k.w., 2-ph., 60-cy., 2,300-v. generator. Fuel under boilers: natural gas, 300 M. cu. ft. being used in 24 hours, at 7½ cents per M. There is also included a 950-h.p. gas engine, direct connected to a 666-k.w., 2-ph., 60-cy., 2,300-v. generator, and three other gas engines of 360, 125 and 85 h.p., belted, respectively, to a 250-k.w., 550-v., d.c. generator for railway purposes, a 75-k.w. and a 50-k.w., 2-ph., 60 cy., 2,300-v. generator. Natural gas is also used in these engines, the daily consumption being 75 M. cu. ft. at 7½ cents per M. Maximum load, 450 k.w.; annual load factor, 65 per cent. Plant first installed 1887, but extended since. It gives continuous service and is valued at $130,000. Cost of generation, approximately 0·75 cent per k.w.h. at the switchboard. **Distribution:** 26 mi. of streets; primaries at 2,200 v. and

secondaries at 110 v. and 220 v.; 227 line transformers, of from 1 k.w. to 75 k.w. Number of consumers, 1,700; connected load, 3,600 k.w. for lighting and 800 h.p. in motors. Distribution system valued at $60,000. **Rates:** Domestic lighting rate, from 1·75 to 7 cents per k.w.h., according to consumption; commercial, from 0·7 cent to 7 cents per k.w.h.; power, from 1 cent to 4 cents per k.w.h.

CHATSWORTH, Grey Co. (286*). Supplied under municipal control, 20 h.p. being obtained from the Eugenia system of the Hydro-Electric Power Commission, at $30.12 per h.p.-year. **Substation:** Three 25-k.v.a. station transformers step the voltage down from 22,000 v. to 4,000 v., 3 ph., 60 cy. **Distribution:** 3 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v.; 7 line transformers, of a total value of $547, supply 64 consumers, connected power load alone being 30 h.p. in motors. Distribution system valued at $4,800. **Rates:** Domestic lighting rate, from 2·25 to 4·5 cents per k.w.h.; commercial, from 0·9 to 9 cents per k.w.h.; power rate from 0·15 to 3·5 cents per k.w.h., according to consumption plus a monthly service charge of $1 per h.p.; all rates subject to 10 per cent discount, with an additional 10 per cent discount for power. Street lighting: 150-w. lamps at $12 per lamp per year.

CHELTENHAM, Peel Co. Supplied from Niagara system of Hydro-Electric Power Commission. Energy principally used for power purposes at brick yard. **Substation:** Three 75-k.w. transformers, stepping voltage from 13,200 v. to 575 v. at 3 ph., 25 cy.

CHESLEY, Bruce Co. (1,860*). Supplied from Eugenia system of Hydro-Electric Power Commission, 100 h.p. at $40 per h.p.-year at 4,000 v. being taken. **Substation:** Three 100-k.v.a. transformers, stepping voltage from 22,000 v. to 4,000 v. at 3 ph., 60 cy. Earnings divided, 55 per cent for lighting, 34 for power and 11 miscellaneous. **Distribution:** 8 mi. of streets and roads; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; line transformers of a total value of $1,313. Number of consumers, 231. Value of system, $26,572, of which $585 is for substation. **Rates:** Domestic, 2·5 to 5 cents per k.w.h. plus 3 cents per 100 sq. ft. of floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power, 0·15 cent to 4·2 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. and 200-w. lamps at $13 per 100-w. lamp per year.

CHESTERVILLE, Dundas Co. (868*). Supplied under municipal control, 108 h.p. being obtained from the St. Lawrence system of the Hydro-Electric Power Commission at $46 per h.p.-year. Energy distributed from the Winchester substation. **Distribution:** 4 mi. of streets or roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 115 k.v.a. total capacity. Number of consumers, 128; connected load, 65 k.w. for lighting and 105 h.p. in motors. Distribution system valued at $7,000. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, from 1 cent to 10 cents per k.w.h., according to consumption; power rate, from 0·3 cent to 4·2 cents per k.w.h., according to consumption, plus a monthly service charge of $1 per h.p.; all rates subject to 10 per cent discount, with an additional 10 per cent for power. Street lighting: 100-w. lamps, at $13 per lamp per year.

CHIPPAWA, Welland Co. (936*). Supplied only in block to large manufacturers directly from the Niagara power companies. Natural gas is used for domestic and commercial use.

CLARKSON, Peel Co. (300†). Supplied from the Toronto Township distribution of the Hydro-Electric Power Commission system. (See under Toronto Township).

CLINTON, Huron Co. (1,981*). Supplied under municipal control, 120 h.p. being obtained in block from the Niagara system of the Hydro-Electric Power Commission, at $42 per h.p.-year. **Substation:** Three 150-k.v.a. station transformers, stepping the voltage down from 26,400 v. to 2,300 v., 3 ph., 25 cy. Output divided, 32 per cent for lighting and 68 per

cent for power. **Distribution:** 15 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 22 line transformers, of from 3 k.w. to 15 k.w. capacity. Number of consumers, 211; connected load, 275 k.w. for lighting and appliances and 108 h.p. in motors. Distribution system valued at $13,000. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 4·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, while the consumption rate varies with the amount of energy consumed. Street lighting: 60-w. lamps, at $12.50 per lamp per year.

COBALT, Timiskaming Dist. (5,079†). Supplied by the Northern Ontario Light and Power Co., the latter having three hydro-electric plants which also supply Liskeard, Haileybury and Kirkland Lake. The greater portion of the energy supplied is used for mining purposes. In addition to the three plants described below, the company also had plants at Chester fall and High fall, on the Wabi river, but these are being dismantled. **Hound Chute Plant:** On the Montreal river. Concrete dam 200 ft. long and 20 ft. high, with an open excavated canal 2,000 ft. long and 40 ft. wide, leading to a concrete power house 150 x 50 feet; available head, 32 feet. There are four vertical units, each a 1,335-h.p. turbine direct connected to an 875-k.v.a., 3-ph., 60-cy., 11,000 v. generator; maximum load adjusted according to requirements of the system and the conditions at the other plants. Water storage is used in connection with this plant with very good results, the reservoirs being situated at Lady Evelyn lake, 28 miles distant, and at Bay lake, near Latchford. Plant installed in 1910. **Fountain Fall Plant:** Also on the Montreal river, 4½ miles below the Hound Chute plant. Concrete dam 250 ft. long and 20 ft. high, with an excavated canal 400 ft. long and 40 ft. wide, leading to a concrete power house 80 x 40 ft.; available head, 30 ft. There are two vertical units, each a 1,500-h.p. turbine operating a 1,250-k.v.a., 3-ph., 60-cy., 11,000-v. generator. The load is also adjusted as described under the Hound Chute plant, while the benefit of the water storage described under latter is also felt. Plant installed in 1914. **Matabitchouan Plant:** On the Matabitchouan river, 25 miles from Cobalt. Concrete dam 675 ft. long and 54 ft. high, with an intake canal 765 ft. long and 18 ft. wide, whence two 5-ft. steel pipes, each 1,065 ft. long, lead to a concrete power house 100 x 50 ft. ; available head, 312 ft. Equipment : four 2,750-h.p. turbines, each direct connected to a 1,875-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Four station transformers, each a 1,875-k.v.a., 3-ph. unit, stepping the voltage up from 2,300 v. to 44,000 v. Reference to maximum load for Hound Chute also applies to this plant, which was installed in 1910. **Transmission Lines:** The transmission system supplied from these various power plants consists of both 11,000-v. and 44,000-v. lines, which converge to the main substations and Cobalt, and either directly or through the latter also supply Liskeard, Haileybury and Kirkland Lake. Interconnection with the Englehart system is also possible through Kirkland Lake, which may be supplied from either system. The Hound Chute line extends to Cobalt, 9 mi.; it comprises two circuits of three No. 000 copper conductors. The line from Fountain fall joins the latter a few miles from Cobalt and is 6 mi. long, operating also at 11,000 v., and consisting of two circuits of three No. 0000 aluminium conductors; a portion of the energy from these two lines goes to the main substation at Cobalt, while the remainder supplies Haileybury and Liskeard directly through an 11,000-v. transmission line 10 mi. long, half of which is double and half single circuit, the conductors used being both No. 2 and No. 4. There are two 44,000-v. lines from Matabitchouan to Cobalt, each line being 25 mi. long, and consisting of three No. 0 aluminium cables. The line supplying Kirkland Lake extends from Cobalt and operates at 44,000 v.; it consists of a single circuit of three No. 2 copper conductors. The system thus comprises a total of 25 mi. of 11,000-v. lines, mostly double circuit, and 90 mi. of 44,000-v. lines. Lightning protection, in all cases, electrolytic arresters, and, with a few exceptions, all lines also carry an overhead ground wire. **Cobalt substation:** Three 1,200-k.v.a. and one 1,000-k.v.a., 3-ph. transformers, stepping voltage down from 44,000 v. to 2,400 v., also three 600-k.v.a. single-ph. units stepping voltage down from 11,000 v. to 2,400 v. Total load on the system, 12,000 k.w.; average yearly load factor, 82 per cent; output divided, approxi-

CANADIAN COPPER CO.—TWO HYDRO-ELECTRIC PLANTS ON SPANISH RIVER, 30 MILES SOUTHWEST OF COPPER CLIFF, SUDBURY DISTRICT, ONT.

NORTHERN ONTARIO LIGHT AND POWER CO.—HYDRO-ELECTRIC PLANT, MATABITCHUAN RIVER, TIMISKAMING DIST., ONT., 25 MILES SOUTH OF COBALT, ONT.

mately, 10 per cent for lighting, 87 per cent for power and 3 per cent for electric railway. **Power distribution system to mines:** Supplied locally to mines at both 11,000 v. and 2,400 v. Transformer equipment in connection with this distribution, approximately 100 station transformers, of 10,000 k.v.a. total capacity; some of the mines are also supplied directly at 2,400 v., no step-down transformers being used. **Cobalt lighting distribution:** Supplied directly from the Cobalt substation described above; 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 35 line transformers, of 200 k.w. total capacity. Number of consumers, 1,500; connected load, 375 k.w. for lighting, 100 h.p. in motors and 350 k.w. for appliances. **Rates:** Meter rate for lighting, 8 cents per k.w.h.; for power or heating appliances, from 1 cent to 3 cents per k.w.h., according to consumption; flat rate for power, $50 per h.p.-year. Street lighting: enclosed arcs at $55 per lamp per year and 100-c.p. incandescent lamps, at $14.50 **Compressed air supply and distribution**—Closely connected with the distribution of hydro-electric energy is the Northern Ontario Light and Power Co.'s compressed air system, which supplies the various mines in the Cobalt district. The compressed air is produced principally at the Ragged Chute plant on the Montreal river, where the Taylor hydraulic system is used, the compressed air being obtained directly from water power. The installation includes a concrete dam 300 ft. long and 20 ft. high, affording a head of 54 ft. The hydraulic air compressor has a capacity of 5,500 h.p., which is equivalent to 40,000 cu. ft. of free air per minute. Compressed air is also produced from motor-driven air compressors at Cobalt and Brady lake. Synchronous motors are used in both places, the total capacity being 8,800 k.v.a. The distribution system includes a total of 80 miles of pipe line, varying in size from 3 inches to 20 inches. The air is supplied at 100 lbs. pressure and is sold at 25 cents per 1,000 cu. ft. at the latter pressure.

COBDEN, Renfrew Co. (727*). Supplied, under municipal control, from a hydro-electric plant on Mill creek. **Hydro-Electric Plant:** Two dams, one of stone 75 ft. long by 25 ft. high, and the other earth-filled, 7 ft. high, whence a 30-in. wood-stave pipe 125 ft. long leads to a brick and frame power house 22 x 18 ft. Head utilized, 48 ft. Equipment: one 135-h.p. turbine, direct connected to a 100-k.v.a., 3-ph., 60-cy., 2,300 v. generator. Water storage on two lakes. The plant, which gives a continuous service, was installed in 1916, and is valued at $22,000. **Distribution:** 3 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; five line transformers, of 40 k.w. total capacity. Number of consumers, 62; the load consists of both lighting and power. **Rates:** Domestic rate, from 0·8 cent to 4 cents per k.w.h.; commercial rate, from 0·8 cent to 8 cents per k.w.h. Street lighting: 150-w. and 250-w. nitro lamps at $12 and $20 per lamp, respectively, per year.

COBOURG, Northumberland Co. (4,879†). Supplied, under commission control, from the Central Ontario system of the Hydro-Electric Power Commission, 525 h.p. being taken. **Substation:** Two 300-k.v.a. station transformers, stepping voltage down from 44,000 v. to 2,200 v., 3 ph., 60 cy.; output divided, 63 per cent for lighting and 37 for power. **Distribution:** 30 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 111 line transformers, of 756 k.w. total capacity. Number of consumers, 729; connected load, 1,556 k.w. for lighting and 769 h.p. in motors. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 2·1 cents per k.w.h., plus a monthly fixed charge of 90 cents per h.p.; all rates subject to 10 per cent discount. Street lighting: 100-w. and 500-w. lamps, at $13 and $47.50 per lamp per year, respectively.

COCHRANE, Timiskaming Dist. (1,619*). Supplied by Northern Ontario Light and Power Co. from a producer-gas plant. **Power Plant:** Frame building 80 x 45 ft. The equipment comprises two gas producers of 300 h.p. and 200 h.p., respectively, and three engines, one of 200 h.p., and the two others of 100 h.p. capacity each, belted, respectively, to 175-k.w., 100-k.w. and 75-k.w. generators; energy generated at 3 ph., 60 cy., 2,200 v. Fuel: pea anthracite coal; yearly consumption, 400 tons, at $11 per ton. Cost of generation, 5 cents per k.w.h. The plant, which gives a continuous service, was installed in 1911 and is valued at

$40,000. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of 135 k.w. total capacity. Number of consumers, 290; connected load, 15 k.w. for lighting, 175 h.p. in motors and 11 k.w. in appliances. Distribution system valued at $10,000. **Rates:** Net meter rate for lighting, 10 cents per k.w.h.; for appliances, from 3 to 5 cents per k.w.h.; meter rate for power, 3 cents per k.w.h.; flat rate for power, from $40 to $50 per h.p.-year. Street lighting: arc lamps and 80-c.p. lamps, at $65 and $21.66 per lamp, respectively, per year.

COLBORNE, Northumberland Co. (1,012*). Supplied by G. M. Peebles, a block of 75 h.p. being obtained from the Central Ontario system of the Hydro-Electric Power Commission at $20 per h.p.-year. **Substation:** One 100-k.v.a., 3-ph. transformer, stepping voltage down from 44,000 v. to 2,200 v. at 60 cy. Load divided, 59 per cent for lighting and 41 for power. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 25 line transformers, of 150 k.w. total capacity. Number of consumers, 200; connected load in motors alone, 65 h.p. **Rates:** Lighting, 8 cents per k.w.h.; appliances 3 cents per k.w.h. Street lighting: 50-w. lamps, at $12 per lamp per year.

COLDWATER, Simcoe Co. (617*). Supplied from Severn system of Hydro-Electric Power Commission, 37 h.p. being taken at $28 per h.p.-year at 2,300 v. **Substation:** One 50-k.v.a. transformer, stepping voltage from 22,000 v. to 2,300 v. Earnings divided, 90 per cent for lighting and 10 for power. **Distribution:** 4 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v. Total value of line transformers, $1,011. Number of consumers, 111. Value of system, $8,261. **Rates:** Domestic, 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, 0·8 cent to 8 cents per k.w.h.; power, ·15 cent to 3·2 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

COLLINGWOOD, Simcoe Co. (7,619†). Supplied under municipal control, being obtained in block from the Severn system of the Hydro-Electric Power Commission, at $30 per h.p.-year at 22,000 v. **Substation:** Three 400-k.v.a. station transformers, stepping voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. Maximum load, 2,000 h.p., at an average load factor of 65 per cent. **Distribution:** 28 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 45 line transformers, of 442 k.w. total capacity. Most power consumers are supplied at 2,200 v. Number of consumers, 1,145; connected load, 445 k.w. for lighting and 1,695 h.p. in motors. Distribution system valued at $28,442. **Rates:** Domestic lighting rate, from 1¼ to 2½ cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·5 cent to 5 cents per k.w.h.; power rate, from 0·15 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. The consumption rate varies with the amount consumed, and all are subject to 10 per cent discount, with 10 per cent additional for power. Street lighting: 100-c.p. nitro lamps, at $10 per lamp per year.

COMBER, Essex Co. Supplied, under municipal control, from the Tilbury substation of the Niagara system of the Hydro-Electric Power Commission, a block of 21 h.p. being obtained at $56.22 per h.p.-year at 4,000 v. **Distribution:** 2½ mi. of streets; primaries at 4,000 v. and at 2,200 v. and secondaries at 110 v.; 5 line transformers, of 35 k.w. total capacity. Practically all the energy is for lighting. Distribution system valued at $5,803. **Rates:** Domestic lighting rate, from 3·5 to 7 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1·4 to 14 cents per k.w.h.; power rate, from 0·15 cent to 6·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street lighting: 100-w. lamps, at $16.50 per lamp per year.

COOKSVILLE, Peel Co. (400†). Supplied from the Toronto Township distribution of the Hydro-Electric Power Commission System. (See under Toronto Township).

COPPER CLIFF, Sudbury Dist. (3,844*). Supplied by the Canadian Copper Co., from two hydro-electric plants at High falls on the Spanish river, the plants being operated principally in connection with the company's mines and works. **Development:** Six concrete

dams, varying in length from 80 ft. to 270 ft. and from 8 ft. to 40 ft. in height, with two concrete bulkheads 100 ft. long. Six steel penstocks, four of which are 9 ft., one 4 ft. and one 13 ft. in diameter; the first five, approximately 300 ft. in length, lead to No. 1 power house, while the 13-ft. penstock leads to No. 2 power house. Head utilized, 85 ft. **No. 1 Plant:** Brick and concrete building, 57 x 110 ft.; available head, 85 ft. In addition to the main power house, the building comprises two transformer sections and a high tension tower. The installation includes four turbines, three of 3,100 h.p. and the fourth of 3,800 h.p. capacity, each direct connected to a 2,000-k.v.a., 3-ph., 25-cy., 2,400-v. generator; also two 320-h.p. independent exciter units, while 18 transformers, of 667 k.v.a., step the voltage up from 2,600 v. to 34,000 v., 3 ph., 25 cy. Installed 1906. **No. 2 Plant:** Brick and concrete building, 39 x 54 ft., situated near No. 1 plant. Equipment: one 7,500-h.p. vertical turbine direct connected to a 5,555-k.v.a., 3-ph., 25-cy., 2,400-v. generator. Installed 1917. An extensive system of water conservation has been constructed for plants on Spanish river. One portion, operated by the Canadian Copper Co., has a total available storage of 350 sq.-mi.-ft., with a main regulating dam at the outlet of Bisco lake; the other portion is operated by the Spanish River Pulp and Paper Co., with a total available storage of 90 sq.-mi.-ft. According to these figures the power possibilities at low water have been more than doubled by this water conservation, which operates very satisfactorily, although some of the lakes are a long distance from plants. Maximum load of both plants, 9,500 k.w. Yearly load factor, 69 per cent. The energy is used principally for the company's mines and works. Output divided into 8 per cent lighting and 92 for power. Continuous service. **Transmission Line:** The line extends from the power house to Copper Cliff, 30 mi., with taps to Creighton and Crean Hill, bringing the total to 37 mi. It operates at 34,000 v., 3 ph., 25 cy., and consists mostly of a double circuit, each of three No. 1 copper conductors, supported by pin-type insulators on wooden poles. Lightning protection, electrolytic arresters. The following substations are supplied with the average amount of power indicated; Copper Cliff, 4,204 k.w.; Creighton, 1,460 k.w.; Crean Hill, 247 k.w. **Substations:** Copper Cliff substation: twelve 667-k.v.a. station transformers, stepping the voltage from 34,000 v. to 2,600 v., 3 ph., 25 cy.; Creighton substation: six 833-k.v.a. and six 275-k.v.a. transformers, stepping the voltage down to 2,600 v. and 550 v; Crean Hill substation: six 275-k.v.a. transformers reducing the voltage to 550 v. The output at the various substations may be divided 8 per cent for lighting and 92 per cent for power purposes in operating mines, etc. **Distribution systems:** Including Copper Cliff, Creighton and Crean Hill, 14½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 84 line transformers, of from 2½ k.v.a. to 40 k.v.a. capacity. **Rates:** Flat rate for lighting, 20 cents per 60-w. lamp per month. Street lighting: 50-c.p. to 200-c.p. tungsten lamps.

CORNWALL, Stormont Co. (6,947*). Supplied by the Stormont Electric Light and Power Co. from two sources, namely, a local hydro-electric plant, on the Cornwall canal, and a block of 320 h.p. purchased from the St. Lawrence Power Company, Ltd., at $13.75 per h.p.-year at 11,000 v.

Stormont Electric Light and Power Co.—Local Hydro-electric Plant: Water is derived from the Cornwall canal and led through a short headrace to a stone power house. Available head, 21 ft. Equipment: two 75-h.p. turbines, geared and belted to a 150-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 90 k.w. The plant is only used in emergencies and during peak loads. Trouble is sometimes experienced from back water in the tailrace, due to ice jams in the St. Lawrence. **Substation:** Used to receive the energy purchased from the St. Lawrence Power Co. Three 200-k.w. and three 50-k.w. station transformers, stepping the voltage down from 11,000 v. to 2,300 v. Load divided, 70 per cent for lighting and 30 for power. **Distribution:** 15 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 109 line transformers, of 575 k.w. total capacity. Number of consumers, 940. **Rates:** The meter rate is 7 cents per k.w.h. Street lighting: 100-c.p. lamps, at $10 per lamp per year.

St. Lawrence Power Co.—The plant is situated at Mille Roches, on the St. Lawrence river, 6 miles west of Cornwall, the company also supplying and distributing energy in the latter

place and in others in the vicinity. **Hydro-Electric Plant:** A dam forms an enlargement of the canal bank and is some 260 ft. long and 22 ft. high, whence an open flume, made of fill, 92 ft. long and 50 ft. wide, leads to the power house. Available head, 30 ft. Equipment: two 1,250-h.p. turbines, each direct connected to a 1,000-k.w., 3-ph., 60-cy., 2,200-v. generator. Energy is stepped up for transmission by means of three 500-k.w. transformers, from 2,200 v. to 11,000 v., 3 ph. Maximum load, 2,300 h.p. The plant, which gives a continuous service, was installed in 1901. **Transmission Lines:** Two lines are supplied from the power plant, one extending 6 mi. westward to Dickinson Landing and the other 6 mi. eastward to Cornwall. Both operate at 11,000 v., the first one a single circuit and the other a double circuit of three No. 6 copper conductors supported by pin-type insulators on wooden poles. Lightning protection, aluminium arresters and horn-gaps with resistances. The following substations are supplied, with the amount of power indicated, the company also distributing power: Cornwall, 1,250 h.p.; Mille Roches, 800 h.p.; Moulinette, 10 h.p.; Wales, 30 h.p.; Dickinson Landing, 50 h.p.; for canal lighting, 400 h.p. **Distribution systems:** Including the various places above mentioned, 6 mi. of streets or roads. **Rates:** Meter rate for lighting, 10 cents per k.w.h., less 10 per cent discount. Street lighting: 60-w. tungsten lamps, at $10 per lamp per year.

COURTICE, Durham Co. Supplied from the Oshawa system. (See under Oshawa).

CREAN HILL MINE, Sudbury Dist. Supplied by the Canadian Copper Co. (See under Copper Cliff).

CREEMORE, Simcoe Co. (599*). Supplied, under municipal control, from the Stayner substation on the Severn system of the Hydro-Electric Power Commission, a block of 75 h.p. being purchased at $54.13 per h.p.-year. Load divided, 45 per cent for lighting and 55 per cent for power. **Distribution:** 5 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 8 line transformers, of 75 k.w. total capacity. Number of consumers, 135; connected load, 30 k.w. for lighting and 38 h.p. in motors. Distribution system valued at $8,815. **Rates:** Domestic lighting rate, from 3·5 to 7 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial rate, from 1·4 to 14 cents per k.w.h.; power rate, from 0·15 cent to 6·4 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $16 per lamp per year.

CREIGHTON MINE, Sudbury Dist. Supplied by the Canadian Copper Co. (See under Copper Cliff).

CRYSTAL BEACH, Welland Co. Supplied from the Fort Erie system. (See under Fort Erie).

DASHWOOD, Huron Co. Supplied from Exeter substation, on Niagara system of Hydro-Electric Power Commission, 50 h.p. being taken at 4,000 v. **Distribution:** Connected load, 50 h.p. for lighting and 50 h.p. in motors.

DELAWARE, Middlesex Co. Supplied, under commission control, 25 h.p. at $46.50 per h.p. year at 4,000 v. being obtained from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 25-k.v.a. transformers, stepping the voltage down from 13,200 v. to 4,000 v., 3 ph., 25 cy., all the energy being used for lighting purposes. **Distribution:** 1 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v.; three line transformers, of 25 k.v.a. total capacity. Number of consumers, 35; connected load, 39 h.p. for lighting. Distribution system valued at $2,969. **Rates:** Domestic lighting rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1·2 to 12 cents per k.w.h.; power rate, from 0·15 cent to 5·4 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

DELHI, Norfolk Co. (664*). Supplied from a hydro-electric plant owned and operated by the Delhi Light and Power Co., 3½ miles southwest of the town. **Hydraulic Plant:** Concrete dam, on Big creek, 24 ft. high by 70 ft. long; available head, 22 ft.; concrete power house 40 x 54 ft. Equipment: one 170-h.p. and one 120-h.p. waterwheel, belted, respectively, to a 200-k.w. and an 80-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 80 k.w., which may be divided, 30 per cent for lighting and 70 for power. Plant gives continuous service, was installed in 1907, and is valued at $60,000. Cost of generation, 4 cents per k.w.h. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 19 line transformers, of 101 k.w. total capacity. Number of consumers, 135; connected load 115 h.p. in motors alone. Distribution system valued at $10,000. **Rates:** Meter rate for lighting, 8 cents per k.w.h., with a meter rental; flat rate for power, from $25 to $40 per h.p.-year. Street lighting: 60-c.p. and 80-c.p. tungsten lamps, at $15 per lamp per year.

DELORO, Hastings Co. (400†). Supplied, under commission control, from the Central Ontario system of the Hydro-Electric Power Commission; the amount supplied is 600 h.p., and, being sold to the mill, is used entirely for industrial purposes. **Substation:** Three 250-k.v.a. station transformers, stepping the voltage down from 44,000 v. to 600 v.

DELTA, Leeds Co. (See under Lyndhurst).

DESERONTO, Hastings Co. (2,061*). Supplied, under commission control, from the Central Ontario system of the Hydro-Electric Power Commission, 355 h.p. being taken. **Substation:** Two 300-k.v.a. station transformers, stepping the voltage down from 44,000 v. to 2,400 v., 3 ph., 60 cy.; output divided, 68 per cent for lighting and 32 for power. **Distribution:** 22 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 33 line transformers, of 497 k.w. total capacity. Number of consumers, 179; connected load, 600 k.w. for lighting and 473 h.p. in motors. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 2·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates are subject to 10 per cent discount. Street lighting: 100-c.p. lamps at $12 per lamp per year.

DICKINSON LANDING, Stormont Co. Supplied by the St. Lawrence Power Co. (See under Cornwall.)

DIXIE, Peel Co. Supplied from the Toronto Township distribution of the Hydro-Electric Power Commission. (See under Toronto Township.)

DORCHESTER, Middlesex Co. (378†). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 25 h.p. being obtained at $45 per h.p.-year at 4,000 v. **Substation:** Three 75 k.w. station transformers, stepping the voltage down from 13,200 v. to 4,000 v., 3 ph., 25 cy. Earnings for the different services may be divided into 63 per cent for lighting and 37 for power. **Distribution:** 2½ mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 9 line transformers, of 47 k.v.a. total capacity. Number of consumers, 79; connected load, 48 h.p. for lighting and 40 h.p. in motors. Distribution system valued at $4,782. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 5·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

DRAYTON, Wellington Co. (613*). Supplied, under municipal control, from the Palmerston substation on the Niagara system of the Hydro-electric Power Commission. Also includes Moorefield. Amount contracted for, 100 h.p., at $60.45 per h.p.-year at 4,000 v. **Distribution:** 2 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and

220 v.; 7 line transformers, of 70 k.w. total capacity. Number of consumers, 90; connected load, 12 k.w. for lighting and 50 h.p. in motors. Value of distribution system, $9,500. **Rates:** Domestic, 1·5 to 7 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, 1·5 to 15 cents per k.w.h. Street lighting: 40-w. and 100-w. tungsten lamps.

DRESDEN, Kent Co. (1,403*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 72 h.p. being obtained at $43 per h.p.-year at 2,200 v. **Substation:** Three 75-k.w. station transformers, stepping voltage down from 26,400 v. to 2,300 v., 3 ph., 25 cy., the output being all used for lighting. **Distribution:** 8 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 25 line transformers, of from 3 k.v.a. to 7½ k.v.a. capacity. Number of consumers, 307; connected load, 41 k.w. Distribution system valued at $15,000. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. nitro lamps at $15 per lamp per year.

DRUMBO, Oxford Co. (272†). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 15 h.p. being obtained at $40.73 per h.p.-year at 4,000 v. **Substation:** Three 75-k.w. station transformers, stepping voltage down from 26,400 v. to 4,000 v., 3 ph., 25 cy., the load being practically all for lighting. **Distribution:** 1½ mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; two line transformers, of 8 k.v.a. total capacity. Number of consumers, 57; connected load, 50 h.p. for lighting. Distribution system valued at $3,845. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 4·7 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

DRYDEN, Kenora Dist. (729*). Supplied under municipal control, being obtained from the Dryden Timber and Power Co., from a hydro-electric plant operated in connection with their mill.

Dryden Timber and Power Company—Hydro-Electric Plant: On Wabigoon river. Sluice-type dam, 120 ft. long by 25 ft. high, with concrete piers 16 ft. apart. A 9-ft. wood-stave conduit, 1,500 ft. long, leads to a concrete power house 52 x 27 ft.; available head, 45 ft.; a surge tank 22 ft. in diameter is also provided. Equipment: two 800-h.p. turbines, each direct connected to a 750-k.w., 3-ph., 60-cy., 600-v. generator. Of the maximum load, only some 20 h.p. is supplied for public use. Power plant valued at $100,000; in operation since 1913.

Municipal Distribution System—Energy from the Dryden Timber and Power Co. at 550 v.; approximately 40 h.p. at $37 per h.p.-year being contracted for. **Distribution:** 8 mi. of streets or roads; primaries at 550 v. and secondaries at 110 v.; 5 line transformers, of 45-k.w. total capacity. Number of consumers, 130; connected load, 27 k.w. for lighting and 16 h.p. in motors. Distribution system valued at $9,000. **Rates:** Meter rate, 10 cents per k.w.h.; flat rate, 0·7 cent per watt per month; meter rate for appliances and motors, 2·5 cents per k.w.h. for restricted use. Street lighting: 60-w. and 100-w. lamps, at $16.80 per 100 w. per year.

DUBLIN, Perth Co. Supplied from Niagara system of Hydro-Electric Power Commission. Recently added.

DUNDALK, Grey Co. (750*). Supplied, under municipal control, from the Eugenia system of the Hydro-Electric Power Commission, 200 h.p. being obtained at $27.20 per h.p.-year at 4,000 v. **Substation:** Three 50-k.v.a. station transformers, stepping voltage down from 22,000 v. to 4,000 v. Earnings for the different services divided, 70 per cent for

lighting and 30 for power. **Distribution:** 3 mi. of streets or roads; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 13 line transformers, of from 5 k.w. to 10 k.w. capacity. Number of consumers, 160; power load alone, 80 h.p. in motors. Distribution system valued at $7,000. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·25 cent to 2·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street lighting: 100-w. lamps at $12 per lamp per year.

DUNDAS, Wentworth Co. (5,016†). Supplied from two sources, one under municipal control and the other, the Dominion Power and Transmission Co.

Municipal System—Supplied from the Niagara system of the Hydro-Electric Power Commission, 528 h.p. being obtained at $14 per h.p.-year at 13,200 v., West Hamilton, Greensville and Ancaster being also supplied. **Substation:** Three 150-k.v.a. station transformers, stepping the voltage down from 13,200 v. to 2,200 v. Earnings from the various services divided, 61 per cent for lighting and 39 for power. Substation valued at $10,650. **Distribution:** 20 mi. of streets or roads; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 93 line transformers, of 883 k.w. total capacity. Number of consumers, 1,002; connected load, of 1,000 h.p. for lighting and 666 h.p. in motors. Distribution system valued at $51,235. **Rates:** Domestic lighting rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from ·15 cent to 5 cents per k.w.h.; power rate, from 0·15 cent to 1·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent for power and further discounts for restricted use. The rates in the three other villages supplied are slightly higher. Street lighting: 100-w. lamps, at $9 per lamp yearly for Dundas, $12 for Greensville, $12 for Ancaster, and $14 for West Hamilton.

Dominion Power and Transmission Co. System—Supplied from the Company's Power Glen hydro-electric and Hamilton steam plants. (See under Hamilton). **Distribution:** Including the line supplied from the Ancaster substation, 8 mi. of streets or roads; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 96 line transformers, of from 0·6 k.w. to 50 k.w. capacity.

DUNNVILLE, Haldimand Co. (3,286†). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission. **Distribution:** 4¼ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 18 line transformers, of 104 k.w. total capacity. Number of consumers, 285; connected load, 300 h.p. for lighting and 10 h.p. in motors. **Rates:** Meter rate, 6 cents per k.w.h.; monthly flat rate, from 23 cents per 25-w. to 60 cents per 100-w. lamps. Street lighting: 100-w. lamps, at $10.50 per lamp per year.

DURHAM, Grey Co. (1,520*). Supplied, under municipal control, from the Eugenia system of the Hydro-Electric Power Commission, 100 h.p. being obtained at $33.97 per h.p.-year at 2,200 v. **Substation:** Three 50-k.w. transformers, stepping voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** 5 mi. of streets or roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 18 line transformers, of 126 k.v.a. total capacity. Number of consumers, 240; connected load, 93 k.w. for lighting and 55 h.p. in motors. Distribution system valued at $18,080, including $585 for the substation. **Rates:** Domestic lighting rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·8 cents, plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

DUTTON, Elgin Co. (840*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 45 h.p. being obtained at $43.53 per h.p.-year at 4,000 v. **Substation:** Three 75-k.w. station transformers, stepping the voltage down from 13,200 v. to 4,000 v., 3 ph., 25 cy., the load being mostly for lighting. **Distribution:** 4½

mi. of streets; primaries at 2,200 v. and 4,000 v. and secondaries at 110 v. and 220 v.; 8 line transformers, of 50 k.w. total capacity. Number of consumers, 165; connected load, 180 h.p. for lighting and 19 h.p. in motors. Distribution system valued at $8,201. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $15.50 per lamp per year.

EASTVIEW, Carleton Co. (3,906*). (See under Ottawa).

EGANVILLE, Renfrew Co. (1,125*). Supplied by J. D. McRae, from a hydro-electric plant on the Bonnechère river, 1½ miles below the town. **Hydraulic Plant:** Concrete pier and stop log dam, 100 ft. long by 13 ft. high, with an adjacent frame power house 20 x 40 ft.; available head, 10 ft. Equipment: two turbines of 120 h.p. and 75 h.p., respectively, belted through a countershaft to a 150-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 100 k.w. Slight trouble is sometimes experienced from back-water. Plant was installed in 1906; night service only. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 15 line transformers, of 56 k.w. total capacity. Number of consumers, 150; connected load, 60 k.w. for lighting and 15 k.w. in appliances. **Rates:** Flat rate, from 12½ to 25 cents per lamp per month, according to number; meter rate, from 8 to 10 cents per k.w.h. Street lighting: 100-w. lamps, at $16 per lamp per year.

ELK LAKE, Timiskaming Dist. (1,456†). Supplied by the Elk Lake Power Co., from a local hydro-electric plant on Bear creek. **Hydro-Electric Plant:** Stone-filled crib dam, 200 ft. in length by 15 ft. high, with a 5 x 5-ft. wooden flume 30 ft. long, leading to a frame power house 16 x 36 ft.; available head, 15 ft. Equipment: one 350-h.p. turbine, belted to a 100-k.w., 3-ph., 60-cy., 550-v. generator. Maximum load, approximately the capacity of the plant, but the latter can be increased to 500 h.p. Plant valued at $24,000, including distribution system; cost of generation, 6 cents per k.w.h.; in operation since 1910, giving night service only. **Distribution:** 5 mi. of streets or roads; primaries at 550 v. and secondaries at 110 v.; 20 line transformers, of 50 k.w. total capacity. Number of consumers, 100; connected load, 30 k.w. for lighting. **Rates:** Meter rate, 8 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $10 per lamp per year.

ELMIRA, Waterloo Co. (2,065*). Supplied from Niagara system of Hydro-Electric Power Commission. Amount taken, 250 h.p., at $38 per h.p.-year at 4,000 v. **Substation:** Three 75-k.w. transformers, stepping voltage from 13,200 v. to 4,000 v. at 3 ph., 25 cy. Output divided, 45 per cent for lighting and 55 for power. **Distribution:** 5 mi. of streets and roads; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; line transformers of a total value of $2,397. Number of consumers, 338; connected load, 370 h.p. for lighting and 165 h.p. in motors. Value of system, $19,810. **Rates:** Domestic, 1·75 to 3·5 cents per k.w.h, plus 3 cents per 100 sq. ft. of floor area per month; commercial, 0·7 cent to 7 cents per k.w.h.; power, 0·15 cent to 3·9 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting, 100-w. lamps at $12 per lamp per year.

ELMVALE, Simcoe Co. Supplied, under municipal control, from the Severn system of the Hydro-Electric Power Commission, 70 h.p. being obtained at $31 per h.p.-year at 2,200 v. **Substation:** Three 75-k.v.a. station transformers, stepping the voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy.; output divided, 47 per cent for lighting and 53 for power. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 16 line transformers, of from 1½ k.w. to 15 k.w. capacity. Number of consumers, 143. **Rates:** Domestic lighting rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

ELMWOOD, Bruce Co. Supplied, under municipal control, from the Eugenia system of the Hydro-Electric Power Commission, 50 h.p. being taken at $35 per h.p.-year. **Substation:** One 3-ph., 50-k.w. station transformer, stepping voltage down from 22,000 v. to 2,200 v., 60 cy. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 4 line transformers, of 55 k.w. total capacity. Number of consumers, 40; connected load, 10 k.w. for lighting and 53 h.p. in motors. Value of system, $5,000. **Rates:** Domestic, 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, 0·9 cent to 9 cents per k.w.h.; power, 0·15 cent to 3·9 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional discounts for restricted power. Street lighting: 100-w. lamps, at $16.50 per lamp per year.

ELORA, Wellington Co. (1,197). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 160 h.p. being obtained at $33.97 per h.p.-year at 4,000 v. **Substation:** Three 75-k.w. transformers, stepping voltage down from 13,200 v. to 4,000 v., 3 ph., 25 cy. Earnings from the various services may be divided into 80 per cent for lighting and 20 for power. **Distribution:** 5 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 18 line transformers, of 309 k.w. total capacity. Number of consumers, 170; connected load, 120 h.p. for lighting and 250 h.p. for power. Distribution system valued at $13,668. **Rates:** Domestic lighting rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 3·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12.50 per lamp per year.

EMBRO, Oxford Co. (472*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 27 h.p. being obtained at $45 per h.p.-year at 2,200 v. **Substation:** Three 75-k.w. station transformers, stepping the voltage down from 13,000 v. to 2,200 v., 3 ph., 25 cy.; earnings may be divided, 93 per cent for lighting and 7 for power. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 9 line transformers, of from 3 k.w. to 10 k.w. capacity. Number of consumers, 101 connected load, 87 h.p. for lighting and 10 h.p. in motors. Distribution system valued at $7,860. **Rates:** Domestic lighting rate, from 2·75 to 5·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1·1 to 11 cents per k.w.h.; power rate, from 0·15 cent to 4·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps at $14 per lamp per year.

ENGLEHART, Timiskaming Dist. (563*). Supplied by Northern Ontario Light and Power Co. from a hydro-electric plant on the South branch of Blanche river, at Charlton, 8 miles distant. Energy is also distributed in Charlton, and can be transmitted to Kirkland Lake, 29 miles distant. **Hydraulic Plant:** Two concrete dams, 12 ft. high and 650 ft. long. A 7-ft. steel flume, 250 ft. long, leads to a reinforced concrete power house 70 x 32 ft., affording 38 ft. head. Installation includes two 540-h.p. turbines, each direct connected to a 400-k.v.a., 3-ph., 60-cy., 2,300-v. generator and belt-driven exciters. Voltage is raised to 33,000 v. for Kirkland Lake line by three 250-k.v.a. transformers, and to 11,000 v. for the Englehart line by three 75-k.v.a. transformers. Plant built in 1914, and operated continuously. **Transmission Lines:** There are two distinct transmission lines from the Charlton power house, one to Englehart, 8 mi., operates at 11,000 v., 60 cy., 3 ph., and is designed to carry 300 k.w. with a loss of 3 per cent. The line to Kirkland Lake, 29 mi., operates at 33,000 v., 3 ph., 60 cy., and is designed to carry 800 k.v.a. with a loss of 7 per cent. Both lines are single circuit of No. 6 copper, supported on pin-type insulators and cedar poles. Lightning protection, horn-gap type arresters, with oil immersed resistance and choke coils. **Substations:** At Englehart, three 75-k.v.a., 60-cy. transformers, delta connected, step voltage down from 11,000 v. to 2,200 v. Output divided, 1½ per cent for lighting and 98½ per cent for power. **Distribution:** For Englehart and Charlton, 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 14 line transformers of

from 3-k.w. to 20-k.w. capacity. Number of consumers, 170; connected load, 33 k.w. for lighting, 75 h.p. in motors and 32 k.w. in appliances. Distribution systems valued at a total of $10,797. **Rates:** Net meter lighting rate, 10 cents per k.w.h.; for appliances, from 1 to 3 cents per k.w.h.; for power, from 1·5 to 3 cents per k.w.h., plus a fixed charge of $1.00 per h.p. per month. Street lighting: 100-w. tungsten lamps, at $14.50 per lamp per year.

ERIN, Wellington Co. (526*). Supplied by Cataract Electric Co. (See under Orangeville).

ERINDALE, Peel Co. Supplied from the Toronto Township distribution of the Hydro-Electric Power Commission. (See under Toronto Township).

ESPANOLA, Sudbury Dist. Supplied by Spanish River Pulp and Paper Mills, Ltd., the plant being operated in connection with their mill, where the total installed capacity is 15,700 h.p. **Hydro-Electric Plant:** On the Spanish river in the village; concrete dam 120 ft. long and 20 ft. to 30 ft. high, with one 12-ft. steel penstock, 320 ft. long, leading to a brick and concrete power house 83 x 46 ft.; available head, 63 feet. Installation: three 1,650-h.p. turbines, each direct connected to a 1,250-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 3,000 h.p., of which only 100 h.p. is for public use. Plant gives continuous service; installed in 1911, and valued at $140,000. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; five line transformers, of 125 k.w. total capacity. Number of consumers supplied, 125; connected load, 75 k.w. for lighting, 20 h.p. in motors and 25 k.w. in appliances. **Rates:** Energy mostly supplied to company's employees and covered by the rent for dwellings. Street lighting: 40-w. and 60-w. tungsten lamps.

ESSEX, Essex Co. (1,429*). Supplied under control of Hydro-Electric Power Commission (Essex County Light and Power Co.); energy transmitted from steam plant at Sandwich. (See under Sandwich).

ETOBICOKE TOWNSHIP, York Co. Supplied, under commission control, from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 150-k.v.a. station transformers step the voltage down from 13,200 v. to 4,000 v. and 2,200 v.; this substation also supplies Mimico asylum, the brick yard and Mimico village. **Distribution:** 38 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v. Number of consumers, 540; connected load, 615 h.p. for lighting, 367 h.p. in motors and 135 k.w. in appliances. **Rates:** Domestic lighting rate 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $14 per lamp per year.

EXETER, Huron Co. (1,504*). Supplied, under municipal control, from the Niagara System of the Hydro-Electric Power Commission, 150 h.p. being obtained at $41.66 at 4,000 v. **Substation:** Three 100-k.w. station transformers step voltage down from 13,200 v. to 4,000 v., 3 ph., 25 cy. Earnings from the various services may be divided, 88 per cent for lighting and 12 for power. **Distribution:** 10 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 18 line transformers, of 178 k.w. total capacity. Number of consumers, 260; connected load, 262 h.p. for lighting and 125 h.p. in motors. Distribution system valued at $17,637. **Rates:** Domestic lighting rate, from 2·75 to 5·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·1 to 11 cents per k.w.h.; power rate, from 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. and 250-w. lamps at $14 and $27 per lamp per year.

FENELON FALLS, Victoria Co. (930*). Supplied under municipal control, from a local municipal hydro-electric plant on Fenelon river. **Hydro-Electric Plant:** Situated at No. 30 dam of the Trent Canal system; dam of concrete-pier, stop-log type, 320 ft. long and 16 ft.

high. A head-race 250 ft. long and 60 ft. wide leads to a concrete-block power house, 30 x 60 ft.; available head, 24 ft. Installation: one 600-h.p. turbine, direc connected to a 400-k.w., 3-ph., 60-cy., 550-v. generator. Maximum load, 200 k.w. The plant, which gives a continuous service, was installed in 1902 and is valued at $55,000. **Distribution:** 15 mi. of streets; primaries at 550 v. and secondaries at 110 v.; 27 line transformers of 125 k.w. total capacity. Number of consumers, 240; connected load, 250 k.w. for lighting and 225 k.w. in motors. Distribution system valued at $10,000. **Rates:** Flat rate for lighting, from $1 to $5 per lamp per year, according to number and uses; flat rate for power, $10 per h.p. year. Street lighting: enclosed arc lamps and 50-c.p. incandescent lamps, at $10 per 50-c.p. lamp per year.

FENWICK, Welland Co. Supplied by Welland Electric Co. See under Welland.

FERGUS, Wellington Co. (1,679*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 110 h.p. being obtained at $33.97 per h.p.-year at 2,300 v. **Substation:** Three 75-k.w station transformers step the voltage down from 13,200 v. to 2,300 v., 3 ph., 25 cy. Earnings for the various services may be divided, 62 per cent for lighting and 38 for power. **Distribution:** 11 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 550 v.; 21 line transformers, of 213 k.v.a. total capacity. Number of consumers, 241; connected load, 250 h.p. for lighting and 160 h.p. in motors. Distribution system valued at $16,000. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 3·5 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, $12.50 per lamp per year.

FLESHERTON, Grey Co. (428*). Supplied, under municipal control, from the Eugenia system of the Hydro-Electric Power Commission, 33 h.p. being obtained at $25.96 per h.p.-year at 4,000 volts; the system being supplied directly from the power plant. **Distribution:** 2 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; six line transformers, of 20 k.w. total capacity. Number of consumers, 103; connected load for power alone, 21 h.p. Distribution system valued at $5,798. **Rates:** Domestic lighting rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 2·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 150-w. lamps, at $11.50 per lamp per year.

FONTHILL, Welland Co. (610†). Supplied by Welland Electric Co. See under Welland.

FORD, Essex Co. (3,136†). Supplied from Walkerville system. See under Walkerville.

FOREST, Lambton Co. (1,421*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 100 h.p. being obtained at $63.27 per h.p.-year at 26,400 v. **Substation:** Three 75-k.w. station transformers, stepping voltage down from 26,400 v. to 2,200 v., 3 ph., 25 cy., the load being practically all for lighting. **Distribution:** 8 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 17 line transformers, of from 2 k.w. to 25 k.w. capacity. Number of consumers, 340; connected load, 180 k.w. for lighting. Distribution system valued at $18,000. **Rates:** Domestic lighting rate, from 3·5 to 7 cents per k.w.h. plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1·4 to 14 cents per k.w.h.; power rate, from 0·15 cent to 7·4 cents plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. and 100-w. nitro and tungsten lamps, at $13.50 per lamp per year for 60-w. and from $18 to $20 for 100-w. lamps per year.

FORMOSA, Bruce Co. Supplied by Walkerton Electric Light and Power Co. See under Walkerton.

FORT ERIE, Welland Co. (1,146). Supplied by the Canadian Niagara Power Co. from their transmission system in connection with the Niagara Falls plant. **Substation:** Three 250-k.v.a. station transformers step the voltage down from 22,000 v. to 4,400 v. and a 25-k.v.a. unit steps the voltage down from 22,000 v. to 2,200 v. The distribution system supplied from this substation also includes Bridgeburg, Ridgeway and Crystal Beach. Maximum load, 250 k.w.; average monthly load factor, 52 per cent. **Distribution:** 18¾ miles of streets; primaries at 4,400 v. and secondaries at 110 v. and 220 v.; 74 line transformers, of 332 k.w. total capacity. Number of consumers, 401; connected load, 315 k.w. for lighting and 784 h.p. in motors. **Rates:** Meter rate for lighting, from 1·5 to 6 cents per k.w.h., with a minimum charge; monthly flat rate for lighting, 20 cents per 25-w. lamp; power rates, 2 to 3 cents per k.w.h., with a minimum charge of $24 per month, or from 0·67 cent to 2 cents per k.w.h., plus a monthly service charge of $1 per k.w. with a minimum charge of $20 per month. Street lighting: arc lamps and 60-w. and 100-w. incandescent lamps, at $15 per 100 w. per year.

FORT FRANCES, Rainy River Dist. (2,788*). Supplied under municipal control, being obtained from the Ontario and Minnesota Power Co. from a local hydro-electric plant operated in connection with the latter's pulp mill.

Ontario and Minnesota Power Co.—Development: Situated on Rainy river, at Fort Frances, some 27,000 h.p. being used, principally for the manufacture of pulp. V-shaped masonry dam, having a spillway 450 ft. long, with a number of sluices. **Hydro-electric Plant:** Built adjacent to the dam on the Canadian side of the river, a head of 28 ft. being obtained. Equipment: four 1,700-h.p. turbine units each direct connected to a 1,250-k.v.a., 3-ph., 60-cy., 6,600-v. generator. The greater portion of the electric energy is used to operate and light the mills, while a small block is supplied to the municipal distribution system. The plant was installed in 1910 and gives a continuous service.

Municipal Distribution System—Energy obtained from the Ontario and Minnesota Power Co., 200 h.p. being purchased at 2,200 v. **Distribution:** 11 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 62 line transformers, of 447 k.w. total capacity. Number of consumers, 555, 15 of these being for power. Distribution system valued at $24,018. **Rates:** Meter lighting rate, 3 cents per k.w.h.; for appliances, 1 cent per k.w.h.; meter power rate, from 1½ to 3 cents per k.w.h., according to consumption; all rates are subject to a minimum charge. Street lighting: 200-w. and 400-w. incandescent lamps at an average of $35 per lamp per year.

FORT WILLIAM, Thunder Bay Dist. (18,850*). Supplied under municipal control, being obtained from the Kaministikwia Power Co's. hydro-electric plant situated at Kakabeka falls. The energy for Port Arthur is also supplied from this plant.

Kaministikwia Power Co.—Hydro-electric Plant: The plant is situated at Kakabeka falls, on the Kaministikwia river, 18½ miles from Fort William. Concrete-pier stop-log type dam, 370 ft. long and from 10 to 21 ft. high; thence, three 10-ft. reinforced concrete flumes, 1¼ mi. long, lead to a forebay. From this, the water is carried through three 7½-ft. and one 11-ft. steel penstocks, 760 ft. long, each controlled by automatic butterfly gates, to a reinforced concrete power house, 50 x 220 ft. Head utilized, 178 ft. Equipment: three 7,200 h.-p. turbines, direct connected to three 4,700-k.v.a., 3-ph., 60-cy., 4,000-v. generators, and one 12,500-h.p. turbine, direct connected to one 9,375 k.v.a., 3-p.h., 60-cy., 4,000-v. generator. Nine 1,475-k.v.a. station transformers step the voltage up from 4,000 v. to 25,000 v., 3 ph., 60 cy. A conservation water storage dam, at the outlet of Dog lake, 30 mi. from plant, controls a storage capacity of 52 sq. mi. to a depth of 22 ft., affording complete regulation of flow. Maximum demand, 11,600 k.w.; annual load factor, 25·4 per cent. Power plant and development valued at $4,321,689; cost of generation is estimated at 0·45 cent per k.w.h. Plant installed in 1906; continuous service. **Transmission Line:** From Kakabeka falls to Fort William, 18·5 miles. It consists of three circuits on two pole lines, each circuit consisting of three No. 00 copper conductors supported by pin-type insulators on wooden poles, operating at 25,000 v., 3 ph., 60 cy.

Lightning protection, aluminium cell arresters and overhead ground wires along the line. A tap from the main line supplies the Port Arthur substation, this portion being an additional 5 miles in length. The line supplies the Fort William and Port Arthur substations and also the Superior Tile Co., the latter having a load of some 150 h.p. **Fort William Substation:** Nine 1,475-k.v.a. station transformers step the voltage down from 25,000 v. to 4,800 v. and 2,400 v. **Distribution:** The Kaministikwia Power Co. also distributes energy in Fort William for power purposes only. Distribution system: 11 mi. of 25,000-v. and 12 mi. of 2,400-v. lines; 56 service transformers, of from 5 k.v.a. to 400 k.v.a. capacity. Number of consumers, 45; the entire load being for power purposes. **Rates:** Power service, $25 per h.p.-year.

Municipal Distribution System Energy supplied by the Kaministikwia Power Co. at 2,400 v., 2,425 h.p. being purchased at $21 per h.p.-year. Energy may be divided, 61 per cent for lighting and power, 8 per cent for street lighting and 31 per cent for street railway purposes; average load factor, about 40 per cent. **Distribution:** 42 mi. of streets, with 1,000 ft. underground; primaries at 2,200 v. and secondaries at 110 v. and 550 v.; 178 line transformers, of from 1 k.w. to 40 k.w. capacity. Number of consumers, 5,500; connected load, 130 k.w. for lighting, 323 k.w. for power and 320 k.w. in appliances. Distribution system valued at $250,000. **Rates:** Meter rate, 5 cents per k.w.h., with a minimum charge, less from 10 to 50 per cent discount according to consumption; flat rate, from 0·9 cent to 1·8 cents per watt per month, according to uses; meter rate for appliances, 1½ cents per k.w.h., with a minimum charge; flat rate for power, $25 per h.p.-year; meter rate for power, 4 cents per k.w.h. Street lighting: magnetite arc lamps and 100-w. tungsten lamps, at $45 and $9.60 per lamp per year.

FRANKFORD, Hastings Co. (700†). Supplied by the Frankford Electric Light Co., from a hydro-electric plant operated in connection with the Canada Boxboard Co. **Hydraulic Plant:** Energy derived from the Trent river, under a 12½-ft. head. Equipment: one turbine, which is also used for mill operation, belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. **Distribution:** 2¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 9 line transformers, of from 1 to 5 k.w. capacity. **Rates:** Meter rate, 9 cents per k.w.h., with a minimum charge.

GALT, Waterloo Co. (11,920*). Supplied under municipal control, 2,500 h.p. at 6,600 volts at $20 per h.p.-year being obtained from the Niagara system of the Hydro-Electric Power Commission. **Substation:** 15 transformers, having a total capacity of 2,550 k.w., step the voltage down from 6,600 v. to 2,200 v., 3 ph., 25 cy. Earnings divided, 55 per cent for lighting and 45 per cent for power. **Distribution:** 36 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 147 line transformers, of 1,778 k.v.a. total capacity. Number of consumers, 2,701; connected load, 6,000 h.p. for lighting and 2,679 h.p. in motors. Distribution system valued at $277,118, of which $26,100 is for the substation. **Rates:** Domestic lighting rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·5 cent to 5 cents per k.w.h.; power rate, from 0·18 cent to 2·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 25 per cent for power. Street lighting: 75-w. to 500-w. incandescent lamps.

GANANOQUE, Leeds Co. (3,593*). Supplied by Gananoque Electric Light and Water Supply Co. from a hydro-electric plant and steam plant in Gananoque and also a hydraulic plant at Kingston Mills. Energy from the latter plant, which is described under Kingston Mills, is also transmitted to Kingston. **Gananoque Hydro-Electric Plant:** The development, which is on the Gananoque river, comprises a dam, whence a 4½-ft. steel penstock, 12 ft. long, leads to a stone and brick power house 40 x 60 ft.; available head, 14 feet. Equipment: one 200-h.p. turbine, direct connected to a 150-k.w., d.c. generator at 250 v. Maximum demand, full capacity of the generator; load factor, 40 per cent. Charleston lake is used for storing water, a shortage of which is sometimes felt during summer months. Plant installed in 1892; operates practically continuously. **Steam Plant:** Combined with

the hydraulic plant, and consists of a stone and brick building, 30 x 60 ft., containing a 200-h.p. return tubular boiler at 100 lbs. pressure and a 250-h.p. Corliss tandem compound engine belted to a 150-k.w., d.c. generator. Steam plant mostly used as an auxiliary during low water in summer. Fuel: hard and soft coal screenings, the consumption varying with the duration of low water. Plant installed in 1892. **Substation:** The equipment, which is used for the energy received from the Kingston Mills plant, comprises three 200-k.v.a. station transformers, stepping the voltage down from 13,200 v. to 550 v., 3 ph., 60 cy.; also two 60-k.w. motor generator units, the latter being used to convert the energy to direct current, which is used for the local distribution. Amount taken from the two hydraulic plants and the steam plant, 300 k.w. **Distribution:** 20 mi. of streets; distribution effected at 220 v., 3 wire, d.c. and 550 v., a.c. and supplying 465 consumers; power load, 34 motors. **Rates:** Lighting meter rate, 6½ cents per k.w.h., or 2·7 cents per k.w.h. plus 3½ cents per 100 sq. ft. of area per month; power rate, from 0·2 cent to 2·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. or a straight meter rate of 3 to 6½ cents per k.w.h. for small motors. Street lighting: 60-c.p. lamps, at $7.20 per lamp per year.

GEORGETOWN, Halton Co. (1,654*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 400 h.p. being obtained at $36 per h.p.-year at 4,000 volts; the system also supplies Glen Williams. **Substation:** Three 150-k.w. station transformers step the voltage down from 13,200 v. to 4,000 v. Earnings divided, 40 per cent for lighting and 60 per cent for power. **Distribution:** 9 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 34 line transformers, of 435 k.w. total capacity. Number of consumers, 426; connected load, 439 h.p. for lighting and 470 h.p. in motors. Distribution system valued at $30,944. **Rates:** Domestic lighting rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·15 cent to 3·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street ighting: 100-w. lamps, at $11 per lamp per year; $12 per lamp for Glen Williams.

GLENCOE, Middlesex Co. (847*). Supplied, under municipal control, from a producer-gas plant. **Power Plant:** Brick and frame building, 48 x 27 ft., containing a 100-h.p. gas producer and a 96-h.p. suction gas engine, belted to a 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 80 h.p. Fuel: anthracite pea coal; yearly consumption 100 tons, at $8.00 per ton. Night service only. Plant installed in 1908 and valued at $11,000. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of 120 k.w. total capacity. Number of consumers, 150; connected load, 60 k.w. for lighting. Distribution system valued at $3,000. **Rates:** Meter rate, from 8 to 10 cents per k.w.h., according to uses. Street lighting: 100-c.p. nitro lamps, at $10 per lamp per year.

GLEN WILLIAMS, Halton Co. Supplied from the Georgetown system. See under Georgetown.

GODERICH, Huron Co. (4,553*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 300 h.p. being obtained at $43 per h.p.-year at 27,000 volts. **Substation:** Three 250-k.w. station transformers step the voltage down from 27,000 v. to 2,300 v., 3 ph., 25 cy. Earnings divided, 78 per cent for lighting and 22 per cent for power. **Distribution:** 50 mi. of streets, one mile underground; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 33 line transformers, of from 5 k.w. to 20 k.w. capacity. Number of consumers, 700; connected load, 700 h.p. for lighting and 395 h.p. in motors. Total value of system, $85,346, of which $9,943 is for the substation. **Rates:** Domestic lighting rate, from 2¼ to 4½ cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 4·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street lighting: 100-w. to 250-w. lamps, at $14 and $35 per lamp, respectively, per year.

DOMINION POWER AND TRANSMISSION CO.—HYDRO-ELECTRIC PLANT AT POWER GLEN,
33 MILES EAST OF HAMILTON, ONT.

DOMINION POWER AND TRANSMISSION CO., AUXILIARY STEAM PLANT, HAMILTON, ONT.
Largest auxiliary plant in Canada. 20,000 k.w. in steam turbine units.

GOWGANDA, Timiskaming Dist. (230†). Supplied by the Gowganda Power Co., from a local hydro-electric plant on the East branch of the Montreal river. The energy is almost entirely used for mining purposes. **Hydro-electric Plant:** Rock-filled cribwork dam, 80 ft. long and 10 ft. high, with a wing dam 1½ ft. high, extending an additional 300 ft. From the dam, a 7-ft. wood-stave pipe, 1,400 ft. long, leads to a frame power house 30 x 30 ft.; available head, 29 feet. Equipment: two 400-h.p. turbines, both geared to the same 640-k.w., 3-ph., 60-cy., 4,000-v. generator. Maximum load, full capacity of the plant. Slight trouble is sometimes experienced from shortage of water during four months of the year, but water storage is possible in a number of lakes above the plant. Plant valued at $68,600; cost of generation, $31.95 per h.p.-year. Plant completed in 1914; practically continuous service. **Distribution:** Total energy is consumed by the Miller Lake-O'Brien mine, the distribution comprising the 2-mile supply line between the latter and the power plant. Energy stepped down from 4,000 v. to 550 v. for power and 110 v. for lighting purposes; load divided, 20 per cent for lighting and 80 per cent for power.

GRAND VALLEY, Dufferin Co. (586*). Supplied, under municipal control, from the Eugenia system of the Hydro-Electric Power Commission, 100 h.p. being obtained at $45 per h.p.-year at 2,200 volts. **Substation:** Three 75-k.v.a. station transformers step the voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy.; output practically all for lighting. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 6 line transformers, of 50 k.w. total capacity. Number of consumers, 100. **Rates:** Domestic lighting rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·2 to 12 cents. Street lighting: 100-w. lamps, at $14 per lamp per year.

GRANTHAM TOWNSHIP, Lincoln Co. Supplied from St. Catharines substation on Niagara system of Hydro-Electric Power Commission, 22 h.p. being taken, all for lighting. **Distribution:** 26½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; line transformers valued at $1,426. Number of consumers, 158; connected load, 150 h.p. for lighting. Value of system, $7,700. **Rates:** 4½ cents per k.w.h., plus 45 cents to $2 monthly service charge; less 10 per cent discount.

GRANTON, Middlesex Co. (289†). Supplied, under municipal control, from the Lucan substation of the Niagara system of the Hydro-Electric Power Commission, 35 h.p. being obtained at $48 per h.p.-year at 4,000 volts. **Distribution:** 2 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 4 line transformers, of 100 h.p. total capacity. Number of consumers, 57; connected load, 60 h.p. for lighting and 30 h.p. in motors. Distribution system valued at $3,598. **Rates:** Domestic lighting rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. area per month; commercial, from 1·2 to 12 cents per k.w.h.; power rate, from 0·15 cent to 5·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $15 per lamp per year.

GRAVENHURST, Muskoka Dist. (1,624). Supplied, under municipal control, from the Muskoka system of the Hydro-Electric Power Commission, 250 h.p. being obtained at a cost of $12.65 per h.p.-year at 6,600 v. **Substation:** Two 300-k.w. and two 250-k.w. station transformers step the voltage down from 6,600 v., 3 ph., to 2,200 v., 2 ph., 60 cy. Substation and equipment valued at $13,407. **Distribution:** 4½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 52 line transformers, of from 1 k.w. to 15 k.w. capacity. Number of consumers, 335; connected load, 300 k.w. for lighting and 216 h.p. in motors. Distribution system valued at $26,000. **Rates:** Domestic lighting rate, 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 3 to 6 cents per k.w.h.; lighting rates subject to 10 per cent discount; power rate, from 0.167 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p., the latter being subject to discounts of from 10 to 28 per cent. Street lighting: 100-w. and 150-w. nitro lamps, at $8 per lamp per year.

GREENSVILLE, Wentworth Co. (223†). Supplied from the Dundas system. See under Dundas.

GRIMSBY, Lincoln Co. (1,786†). Supplied by the Dominion Power and Transmission Company. See under Hamilton. System also includes North Grimsby township. **Distribution:** 12 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 116 line transformers, of from ·6 k.w. to 20 k.w. capacity. **Rates:** Domestic, 5 cents per k.w.h.; commercial, 0·15 cent to 6 cents per k.w.h.; both rates subject to 10 per cent discount and a monthly minimum. Street lighting: 60-c.p. lamps, at $10 per lamp per year.

GUELPH, Wellington Co. (16,308†). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, 3,500 h.p. being obtained at $20 per h.p.-year at 13,200 volts. The Commission also supplies the Ontario Agricultural College and the prison farm, with 160 h.p. and 203 h.p., respectively. A small local hydro-electric plant is sometimes used as an auxiliary. **Auxiliary Hydraulic Plant:** Situated on the Speed river; concrete dam 100 ft. long by 12 ft. high, affording a 12-ft. head. Capacity of plant, about 200 h.p., but the load carried is usually only 80 h.p. for approximately 30 days during the year. **Substations:** Three 550-k.v.a. station transformers step the voltage down from 13,200 v. to 2,300 v.; also seven of 225 k.v.a. step the voltage down to 575 v. The ten station transformers are each a 3-ph. unit, operating at 25 cy., and are distributed in six different stations in the city. The substation equipment also includes two motor-generator sets, having a total generator capacity of 500 k.w. at 550 v., d.c., for street railway operation. Output divided, 26 per cent for lighting, 62 per cent for power and 12 per cent for street railway; average load factor, 67 per cent. **Distribution:** 47½ mi. of streets, with 850 ft. underground; primaries at 2,200 v. and secondaries at 110 v. to 575 v.; 150 line transformers, of from 1 k.v.a. to 20 k.v.a. capacity. Number of consumers, 2,609; connected load, 2,800 h.p. for lighting and 4,500 h.p. in motors. Entire system valued at $239,500, of which $59,000 is for the substation and $36,100 for the local hydraulic plant. **Rates:** Domestic lighting rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·4 cent to 4 cents per k.w.h.; power rate, from 0·16 cent to 1·867 cents per k.w.h.; plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount, with an additional 25 per cent discount for power. Street lighting: 100-w. to 1,000-w. nitro and tungsten lamps, at $8.50 per 100-w. lamp per year; other sizes in proportion.

HAGERSVILLE, Haldimand Co. (1,053*). Supplied under municipal control, 100 h.p. at $33.21 per h.p.-year at 4,000 volts being obtained from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 75-k.w. station transformers step the voltage down from 13,200 v. to 4,000 v. Earnings divided, 62 per cent for lighting and 38 per cent for power. **Distribution:** 4 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 15 line transformers, of 73 k.w. total capacity. Number of consumers, 200; connected load, 240 h.p. for lighting and 100 h.p. in motors. Distribution system valued at $10,440. **Rates:** Domestic lighting rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 3·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

HAILEYBURY, Timiskaming Dist. (3,410*). Supplied by the Northern Ontario Light and Power Co. See under Cobalt. **Substation:** Three 100-k.v.a. station transformers step voltage down from 11,000 v. to 2,200 v. Load, 200 k.w., divided equally between power and lighting. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 28 line transformers, of 314 k.w. total capacity. Number of consumers, 840; connected load, 90 k.w. for lighting, 170 h.p. in motors and 175 k.w. in appliances. **Rates:** Meter lighting rate, 8 cents per k.w.h.; power or heating appliances, from 1 cent to 3 cents

per k.w.h., according to consumption; flat rate for power, $50 per h.p.-year. Street lighting: enclosed arcs and 100-c.p. incandescent lamps, at, respectively, $55 and $14.50 per lamp per year.

HAMILTON, Wentworth Co. (101,491*). Distribution both by the municipality, which obtains energy in bulk from the Hydro-Electric Power Commission, and by the Dominion Power and Transmission Co. from its hydro-electric plant at Power Glen, the company also having an auxiliary steam plant in Hamilton and a smaller hydro-electric plant at Brantford.

Municipal System—Supplied from the Niagara system of the Hydro-Electric Power Commission, 15,000 h.p. at $14 per h.p.-year being purchased. **Substation:** Sixteen 500-k.w. station transformers step voltage down from 13,200 v. to 2,200 v., and one 500-k.w., 3-ph. transformer steps voltage down from 13,200 v. to 550 v., 3 ph., 25 cy. Earnings divided, 65 per cent for lighting, 34 per cent for power and 1 per cent for miscellaneous; yearly load factor, 60·5 per cent. **Distribution:** 168 mi. of streets, 7 mi. being underground; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 543 line transformers, of from 3 k.w. to 100 k.w. capacity. Number of consumers, 15,334; connected load, 11,000 k.w. for lighting and 12,000 h.p. in motors. Distribution system valued at $1,084,200, including $89,714 for the substation. **Rates:** Domestic lighting rate, 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·12 cent to 3·5 cents per k.w.h.; power rate, from 0·1 cent to 1 cent per k.w.h., plus a monthly fixed charge of 70 cents per h.p.; all rates subject to 10 per cent discount, with additional discounts up to 40 per cent for power, based on restrictions in use. Street lighting: 500-w. nitro lamps, 250-w. and 100-w. tungsten lamps, at $40, $12 and $7.20 per lamp per year, respectively, respectively.

Dominion Power and Transmission Co. System—This system also supplies energy in Beamsville, Burlington, Brantford, St. Catharines, Welland, Dundas, Oakville, Stoney Creek, Winona, Fonthill and Fenwick. **Hydraulic Plant:** The power plant derives its water from lake Erie, *via* Welland canal. Installation: seven 6.5-ft. steel penstocks, 800 ft. long, lead to a brick, steel and concrete power house, 500 x 65 ft., where a head of 270 feet is used. Equipment: six 7,500-h.p. turbines, four of which are direct connected to a 6,200-k.w. and two to a 6,000-k.w. generator; two 3,000-h.p. turbines, each connected to a 2,000-k.w. generator; one 3,500-h.p. turbine direct connected to a 2,500-k.w. generator, and one 800-h.p. unit, which it is estimated gives a total capacity of 52,000 electrical h.p. The exciters are motor driven, the energy being supplied from the 800-h.p. unit. Station transformers, aggregating about 40,000 k.w., step the voltage up from 2,400 v. to 44,000 v. Current is generated at 3 ph., 66 cy., 2,400 v.; transmission voltage is from 12,000 v. to 44,000 v. Slight hydraulic trouble is experienced from ice. First installation in 1898; the last units in 1912. Brantford plant is situated on the Grand river and operates under a head of 33 feet, the installation having a total capacity of 1,100 h.p. **Steam Plant:** four 1,000-h.p. water-tube boilers, at 200 lbs. pressure and 200 degrees super-heat, and two 10,000-k.w. steam turbine units, 3 ph., 66 cy., 6,600 v. An older steam plant, of 2,500 k.w. capacity, is seldom used. Fuel: run-of-mine coal, at $6 per ton. The plant is used as an auxiliary approximately 55 hours per week. The old steam plant was installed in 1903, the new one in 1916. **Transmission Lines:** There are three transmission lines from the Power Glen hydraulic plant to Hamilton, each 33 miles long; energy transmitted at 44,000 v., 3 ph., 66 cy., with an estimated loss of 6 per cent. Two lines consist of wooden poles and the third of steel Λ frames, supporting the conductors on pin-type insulators. Lightning protection, electrolytic arresters and rounded steel wires for all transmission circuits. From Hamilton two lines extend to Brantford, 23 miles, and single lines to Oakville, 23 miles, and Dundas, 7 miles; other lines from the hydraulic plant also extend to St. Catharines, 2¾ miles, and Welland, 9 miles, giving a total of 187 miles of single lines. From this system, a large amount of energy is also supplied to operate the following electric railway systems: Brantford and Hamilton railway, Hamilton, Grimsby and Beamsville railway, Hamilton and Dundas railway, Hamilton Radial railway and Hamilton Street railway. **Hamilton Substation:** 48 station transformers, of 40,000 k.w. total capacity. **Distribution in Hamilton:** 90 mi. of streets; primaries at 2,400 v., 2 ph., and 13,200 v., 3 ph., and secondaries at 110 v. to 550 v.; 1,509 line transformers, of from 0.6 k.w. to 350 k.w. capacity.

HANOVER, Grey Co. (3,310*). Supplied under municipal control, 300 h.p. at the rate of $35 per h.p.-year being obtained from the Eugenia system of the Hydro-Electric Power Commission, the system also supplying Neustadt and Carlsruhe. **Substation:** Three 125-k.v.a. station transformers step the voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** 18 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 33 line transformers, of 203 k.w. total capacity. Number of consumers, 400; connected load, 150 k.w. for lighting, and 100 h.p. in motors. Distribution system valued at $15,625. **Rates:** Domestic lighting rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: enclosed arc lamps, at $35 per lamp per year.

HARRISTON, Wellington Co. (1,563*). Supplied under municipal control, 100 h.p. at $46.62 per h.p.-year, at 4,000 v. being obtained from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 75-k.w. station transformers step voltage down from 26,400 v. to 4,000 v., 3 ph., 25 cy. Load divided, 33 per cent for lighting and 67 per cent for power. **Distribution:** 10 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 22 line transformers, of 165 k.w. total capacity. Number of consumers, 200; connected load, 50 k.w. for lighting and 125 h.p. in motors. Distribution system valued at $15,000, including the substation. **Rates:** Domestic lighting rate, from 2·75 to 5·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·1 to 11 cents per k.w.h.; power rate, from 0·15 cent to 4·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. nitrogen lamps, at $16.50 per lamp per year.

HASTINGS, Northumberland Co. (705*). Supplied by Fowlds Co., from a hydro-electric plant on the Trent river. **Hydraulic Plant:** The concrete dam, which is a part of the Trent Canal system, is 442 ft. long by 13·5 ft. high. Three flumes lead to a frame power house 20 x 30 ft., where a 9-ft. head is available. Installation: two turbines, one of 60 h.p. and one of 30 h.p., both belt connected to the same 150-k.w., 2-ph., 60-cy., 2,200-v. generator. Maximum load, 60 k.w. Slight trouble is sometimes experienced from anchor ice in winter and back water in spring. Shortage of water is unknown, due to large pondage from Rice lake and government conservation dams. Total cost of plant, exclusive of dam, $10,000; cost of generation, 11 cents per k.w.h., or $12 per h.p.-year. First plant at this site installed in 1894; present plant in 1907; operates at night only. **Distribution:** 6½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 41 k.w. total capacity. Number of consumers, 141; connected load, 58 k.w. in lighting and 2¼ k.w. in power. Distribution system valued at $6,000. **Rates:** Flat rate, 25 cents per lamp per month. Street lighting: enclosed arc lamps.

HAVELOCK, Peterborough Co. (1,213*). Supplied by the Havelock Electric Light and Power Co. from a hydro-electric and steam plant on North river, 7 miles north of the village. **Hydro-electric Plant:** Reinforced concrete dam 50 ft. long and 4 ft. high, with a 6-ft. wood-stave pipe, 150 ft. long, leading to a frame power house, 20 x 40 ft., with an extension 12 x 12 ft.; available head, 19 ft. Equipment: two 75-h.p. turbines, both belted to the same 100-k.w., 3-ph., 60-cy., 4,400-v. generator. Maximum load, full capacity of plant; night service only. Water storage is used in some of the upper lakes, but some difficulty is experienced, particularly in the release of the water at the proper time. Plant installed in 1903, and valued at $16,000. **Steam Plant:** Stone boiler room, 30 x 18 ft. Equipment: one 150-h.p. return tubular boiler at 125 lbs. pressure and a 300-h.p. engine, which is used to drive the same generator as the hydraulic turbine. Fuel: wood, at approximately $1 per cord. Steam plant installed in 1914; used in emergencies only. **Distribution:** Including the 7 mi. of supply line, 10 mi. of streets; primaries at 4,400 v. and secondaries at 110 v.; 15 line transformers, of from 5 k.w. to 7½ k.w. capacity. **Rates:** Flat rate, from

$1.50 to $3.00 per 16-c.p. lamp per year, according to uses. Street lighting: 300-w. tungsten lamps, at $75 per lamp per year.

HAWKESBURY, Prescott Co. (4,742*). Supplied by the Hawkesbury Electric Co., from two hydro-electric plants on the Rouge river, at Table fall and Bell fall, respectively, in Quebec. The system also supplies Grenville, Que.; L'Orignal, Ont.; and Vankleek Hill, Ont., while a large block is also taken by the Riordon Co. **Table Fall Hydro-electric Plant:** Situated on the Rouge river, 5 miles from its mouth; rock-filled crib dam, 400 ft. long and 18 ft. high, with four steel penstocks from 5 to 9½ ft. diam. and 25 ft. long, leading to a concrete power house 64 x 37 ft.; available head, 28 ft. Equipment: one 850-h.p. and two 450-h.p. turbines, direct connected, respectively, to a 550-k.w. and two 300-k.w., 3-ph., 60-cy., 10,000-v. generators. Maximum demand, 500 k.w. Slight trouble is sometimes experienced from frazil ice. Plant gives practically continuous service; installed in 1904, and valued at $100,000. **Bell Fall Hydro-electric Plant:** Situated on the Rouge river, 11 miles from its mouth; rock-filled crib dam, 180 ft. long and 45 ft. high, with a tunnel through rock of 17 ft. x 17 ft. section and 145 ft. long, leading to an open flume 90 ft. long, thence through two concrete penstocks to a reinforced concrete power house, 79 x 42 ft. Equipment: two 2,400-h.p. turbines, each direct connected to a 2,000-k.v.a., 3-ph., 60-cy., 2,300-v. generator; two 2,000-k.v.a. station transformers step the voltage up from 2,300 v. to 17 500 v., 3 ph., 60 cy. Maximum load, 2,500 h.p. Plant gives a continuous service, was installed in 1915, and is valued at $200,000. **Transmission Lines:** The Table Fall line extends from the latter place to Vankleek Hill, passing through Grenville and Hawkesbury, and crossing the Ottawa river between these two places over the railway bridge; total length, 17½ mi. It operates at 10,000 v., 3 ph., 60 cy., and comprises two circuits of three No. 4 copper conductors, supported by pin-type insulators on wooden poles. Lightning protection, gap arresters at each end and a ground wire over the line. This line supplies substations at Grenville with 100 k.w., at Hawkesbury with 350 k.w., and at Vankleek Hill with 50 k.w. The line from Bell Fall is used entirely to supply the Riordon Pulp and Paper Co.'s mill at Hawkesbury, 2,500 h.p. being transmitted. The line is 10½ mi. long and operates at 17,500 v. as far as the north shore of the Ottawa river, the energy being stepped down to 2,300 v. to cross the river through a submarine cable. The line consists of one circuit of three No. 00 aluminum conductors, supported by pin-type insulators on wooden poles Lightning protection, electrolytic arresters at each end. **Hawkesbury Substation:** Equipment for the Riordon Company owned by the latter. Equipment for the town distribution: three 100-k.w. and three 200-k.w. station transformers, stepping voltage down from 10,000 v. to 2,300 v., 3 ph., 60 cy. Energy supplied may be divided, 58 per cent for lighting and 42 per cent for power. **Distribution:** 8½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 37 line transformers, of from 2 k.w. to 15 k.w. capacity. Number of consumers, 466; connected load, 400 k.w. for lighting and 400 k.w. for power, exclusive of the 2,500 h.p. supplied to the Riordon Co. Distribution system valued at $20,000. **Rates:** Yearly flat rate, $3.60 per 16 c.p.; meter rate, 8 cents per k.w.h.; flat rate for power, from $15 to $24 per h.p.-year. Street lighting: 100-w. lamps, at $12 per lamp per year.

HELEN MINE, Algoma Dist. Supplied by the water-power department of the Algoma Steel Corporation, from a hydro-electric plant at Steep Hill falls, on the Magpie river. The energy derived from this plant is used almost entirely for power purposes in connection with mine operations and is transmitted both to Helen Mine and Magpie Mine. (See also under Michipicoten.) **Hydro-electric Plant:** Reinforced concrete dam, 250 ft. long and 40 ft. high, with 8-ft. steel penstock 270 ft. long, leading to a concrete and brick power house, 60 x 50 ft.; available head, 67 ft. Equipment: two 1,300-h.p. turbines, each direct connected to a 900-k.v.a., 3-ph., 60-cy., 11,000-v. generator; three 450-k.w. station transformers, stepping voltage up from 11,000 v. to 22,000 v., 3 ph., 60 cy. Maximum load, 790 k.w. Slight trouble is at times experienced from shortage of water, which occurs sometimes in March and sometimes in the autumn, but at a normal low stage the flow is approximately

160 second-feet. Plant gives a continuous service, was installed in 1913, and is valued at approximately $200,000. **Transmission Lines:** Two transmission lines extend from the power plant, one to Helen Mine, 5 mi. long, and the other to Magpie Mine, 13 mi. long. Both lines operate at 22,000 v., 3 ph., 60 cy. The Magpie Mine line consists of a single circuit of three No. 00 aluminum cables and the Helen Mine line of three No. 1 cables, supported by pin-type insulators on wooden poles. Lightning protection, aluminum cell and horn-gap arresters and also gap arresters, while ground wires are placed at every fourth pole. **Substation** (at Magpie Mine): Three 400-k.v.a. station transformers step voltage down from 22,000 v. to 550 v. Output practically all used for power; general load factor about 75 per cent. Energy used by company for mining.

HENSALL, Huron Co. (717*). Supplied under municipal control, approximately 120 h.p. being obtained from the Exeter substation on the Niagara system of the Hydro-Electric Power Commission. **Distribution:** 4 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 6 line transformers, of 52 k.w. total capacity. Number of consumers, 140; connected load, 131 h.p. for lighting and 117 h.p. in motors. **Rates:** Meter rate for domestic use, 6 cents per k.w.h.; for commercial use, 12 cents per k.w.h. Street lighting: 100-w. lamps, at $15 per lamp per year.

HESPELER, Waterloo Co. (2,887*). Supplied under municipal control, from the Niagara system of the Hydro-Electric Power Commission, approximately 500 h.p. at $21 per h.p.-year at 6,600 volts being taken. **Substation:** Three 100-k.w. station transformers step voltage down from 6,600 v. to 2,200 v., 3 ph., 25 cy. Output divided, 51 per cent for lighting and 49 per cent for power. **Distribution:** 15 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 40 line transformers, of 335 k.w. total capacity. Number of consumers, 375; connected load, 389 h.p. for lighting and 337 h.p. in motors. Distribution system valued at $12,059. **Rates:** Domestic lighting rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 2·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 150-c.p. and 250-c.p. nitro lamps, at $13 and $18 per lamp per year.

HIGHGATE, Kent Co. Supplied from Niagara system of Hydro-Electric Power Commission. Recently added.

HOARDS (rural distribution), Northumberland Co. Supplied, under public control, from the Central Ontario system of the Hydro-Electric Power Commission, 100 h.p. being taken. Distribution is effected at 6,600 v., the system being supplied from power plant at dam No. 11, near Campbellford. **Substation:** Two 75-k.w. station transformers step voltage up from 2,400 v. to 6,600 v., one transformer being a spare.

HOLSTEIN, Grey Co. Supplied, under municipal control, from the Durham substation on the Eugenia system of the Hydro-Electric Power Commission; 15 h.p. at $43.50 per h.p.-year at 4,000 volts being taken, practically all for lighting. **Distribution:** 1 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v.; three line transformers, supplying 40 consumers. Distribution system valued at $2,453. **Rates:** Domestic lighting rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·2 to 12 cents per k.w.h.; power rate, from 0·15 cent to 5·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 150-w. lamps, at $15.50 per lamp per year.

HORNINGS MILLS, Dufferin Co. Supplied from Shelburne substation on Eugenia system of Hydro-Electric Power Commission, 5 h.p. being taken.

HUMBERSTONE, Welland Co. (1,209*). Supplied under public control, 133 h.p. at $18 per h.p.-year being obtained from the Niagara system (Ontario Power Co.) of the Hydro-Electric Power Commission; load factor, 75 per cent. **Substation:** Three 50-k.w. and

three 25-k.w. station transformers step voltage down from 12,000 v. to 2,200 v., 3 ph., 25 cy. **Distribution:** Including Port Colborne, 8½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 36 line transformers, of 260 k.w. total capacity. Number of consumers, 500; connected load, approximately 250 k.w. for lighting and 100 h.p. in motors. Value of distribution system, $35,000. **Rates:** Meter rate for lighting, from 4 to 7½ cents per k.w.h., with a minimum charge; power rate, from 1 cent to 4 cents per k.w.h. Street lighting: 100-w. lamps, at $9 per lamp per year.

HUNTSVILLE, Muskoka Dist. (2,135*). Supplied under municipal control, 850 h.p. at $22.50 per h.p.-year at 2,200 volts being obtained from the Muskoka system of the Hydro-Electric Power Commission. **Substation:** Three 300-k.w. station transformers step voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. Load divided, 13 per cent for lighting and appliances and 87 per cent for power. **Distribution:** 6½ mi. of streets; primaries at 4,000 v. and secondaries at 110 v.; 37 line transformers, of 1,033 k.w. total capacity. Number of consumers, 300; connected load, 100 k.w. for lighting and 700 h.p. in motors. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. to 400-c.p. nitro and tungsten lamps, at $3.30 to $8.40 per lamp per year.

INGERSOLL, Oxford Co. (5,300*). Supplied under municipal control, 900 h.p. at $23 per h.p.-year at 13,300 volts being obtained from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 250-k.v.a. station transformers step voltage down from 13,000 v. to 2,200 v., 3 ph., 25 cy. Earnings divided, 46 per cent for lighting and 54 per cent for power. Average load factor, 70 per cent. **Distribution:** 25 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 48 line transformers, of from 1 k.w. to 25 k.w. capacity. Number of consumers, 926; connected power load alone, 1,100 h.p. Distribution system valued at $39,811. **Rates:** Domestic lighting rate, 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 3 to 6 cents per k.w.h.; power rate, from 0·15 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. to 1,000-c.p. incandescent lamps, at $11 per 100-c.p. lamp per year.

IROQUOIS, Dundas Co. (870*). Supplied, under municipal control, from a local hydro-electric plant deriving power from the St. Lawrence river. Another plant, operated by M. W. Beach, supplies energy to the St. Lawrence system of the Hydro-Electric Power Commission.

Municipal System—Hydro-electric Plant: A flume 150 ft. long leads from a masonry dam, which is a portion of the canal system, to a stone power house 30 x 42 ft.; available head, 12 feet. Equipment: two turbines, of 75 and 150 h.p. capacity, both connected through gears and belt to the same 125-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 115 h.p. Plant installed in 1901; continuous service. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 20 line transformers, of from 1 k.w. to 10 k.w. capacity. Number of consumers, 175. **Rates:** Yearly flat rate, from 4 to 6·6 cents per watt. Street lighting: 100-c.p. and 150-c.p. nitro lamps, no charge being provided for this service.

Beach Hydro-electric System—Hydro-electric Plant: Water-power derived from the St. Lawrence river, being obtained from the canal system at this point. Concrete penstocks lead from the canal weir to a concrete and brick power house 30 x 30 ft., where a head of 13 ft. is available. Equipment: two 250-h.p. vertical turbines, each direct connected to a 200-k.w., 3-ph., 60-cy., 2,200-v. generator, but the development is intended for a future capacity of 2,400 h.p. Plant valued at $150,000, was installed in 1909, and gives continuous service.

IROQUOIS FALLS, Timiskaming Dist. (1,200*). Supplied by the Abitibi Power and Paper Co. from a hydro-electric plant on the Abitibi river, connected with the mill. **Development:** Concrete dam in two sections, 456 ft. and 221 ft. long, respectively, and from 4 to 25 ft. high, further extended by an earth embankment, 443 ft. long; available head, 42 ft.; total amount of power developed at this site, including the mill and hydro-electric plant, 22,500 h.p. A timber-crib storage dam at Couchiching fall is used to regulate the flow of the river. **Hydro-electric Plant:** Concrete power house, 110 x 75 ft., adjacent to the dam. Equipment: four 2,000-h.p. turbines, each direct connected to a 1,250-k.v.a., 3-ph., 60-cy., 600-v. generator; three 100-k.v.a. station transformers step the voltage up from 600 v. to 2,200 v.; maximum load, 6,200 h.p., of which only 200 k.w. is used for public service. Plant installed in 1915; continuous service. **Distribution:** 1½ mi. of streets; primaries at 2,200 v. and 600 v. and secondaries at 110 v. to 220 v.; 9 line transformers, of 90 k.w. total capacity. Number of consumers, 140; connected load, 70 k.w. for lighting and 15 k.w. in appliances. **Rates:** Energy supplied almost entirely to the company's employees, the monthly charge being from $1.30 to $1.50 per dwelling. Street lighting: 100-w. nitro lamps.

KEEWATIN, Kenora Dist. (1,194*). Supplied from the Kenora municipal system. See under Kenora.

KEMPTVILLE, Grenville Co. (1,034*). The Kemptville Milling Co. distributes energy from a hydro-electric plant on the Rideau river at Andrewsville, 14 miles distant. This plant also supplies Burritt Rapids. **Hydraulic Plant:** Concrete and wooden dam 200 ft. long and 11 ft. high, from which a concrete and wooden flume 15 x 36 ft. leads under the frame power house, 30 x 40 ft., where a head of 12 feet is afforded. Equipment: two 150-h.p. turbines, both belted to the same 250-k.w., 3-ph., 60-cy., 10,000-v. generator. Maximum demand, 175 k.w.; cost of plant, $50,000; cost of generation, $10 per h.p. per year. Plant installed in 1903; continuous service. **Transmission line:** 14 mi. long, extending from Andrewsville to Kemptville; it operates at 10,000 v., 3 ph., 60 cy., the estimated losses when transmitting 200 h.p. being 2 per cent. **Substations:** Two substations, stepping voltage down from 10,000 v. to 2,200 v., are supplied from this line. One at Burritt Rapids includes a 20-k.w. transformer, and one at Kemptville contains three 75-k.w. transformers. Output divided, 150 h.p. for lighting and 50 h.p. for power purposes. Cost of power leaving the substation, $12 per h.p. per year. **Distribution:** Including Burritt Rapids, 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 32 line transformers, supplying 250 consumers. Distribution system valued at $12,000. **Rates:** Meter rate, 8 cents per k.w.h. Street lighting: 60-w. lamps, at $14 per lamp per year.

KENORA, Kenora Dist. (5,246*). Supplied, under municipal control, from a local hydro-electric plant on the east branch of the Winnipeg river, the town of Keewatin also being included under this system. **Hydro-electric Plant:** Concrete dam 192 ft. long and 40 ft. high, with 8 concrete flumes leading through the dam to the adjacent brick and concrete power house, 158 x 43 ft., where a head of 20 ft. is available. Equipment: four 850-h.p. turbines, each direct connected to a 625-k.w., 3-ph., 60-cy., 2,400-v. generator. The development provides for the installation of two additional units. Maximum load, 2,500 k.w. Slight trouble is sometimes experienced from shortage of water, but this can be regulated and controlled by the Norman dam. Plant gives continuous service, was installed in 1906, and is valued at $529.781. **Distribution:** Including Keewatin, 17 mi. of streets, with 1 mi. underground; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 125 line transformers, of from ¼ k.w. to 25 k.w. capacity. Number of consumers, 1,400. **Rates:** Flat rate for lighting, from 35 to 90 cents per 60-w. lamp per month, according to number and uses; domestic meter lighting rate, 3 to 10 cents per k.w.h., with a minimum monthly charge of 6 to 15 cents per 100 sq. ft. area; commercial, monthly fixed charge of 2 to 5 cents per 100 sq. ft. area, plus 7 cents per k.w.h. for lighting and 3 cents per k.w.h. for heating; flat rate for power, from $22 upward per h.p.-year; meter power rate, from 1·25

to 3·5 cents per k.w.h., plus a fixed charge of from $12 to $15 per h.p.-year, the various rates for power being governed by the amount of power used. Street lighting: enclosed arc lamps and 60-w. and 100-w. tungsten lamps.

KESWICK, York Co. Supplied by Toronto and York Radial Railway Co. See under Aurora.

KILSYTH, Grey Co. See under Tara.

KINCARDINE, Bruce Co. (2,032†). Supplied, under municipal control, from a steam-power plant. **Power Plant:** Brick building, 40 x 60 ft., also used for waterworks purposes. It contains two 125-h.p. return tubular boilers at 110 lbs. pressure, these also being used for waterworks purposes. The generating units comprise two 125-h.p. engines belted through a countershaft to the same 150-k.w., 3-ph., 60-cy. generator, only one engine being used at a time. Maximum load, 100 k.w. Fuel: bituminous slack coal; yearly consumption, 1,000 tons, at $6.56 per ton. Plant gives night service only; was installed in 1895, but a smaller plant had been in use previously. It is valued at $25,161, including the system of electric distribution, but exclusive of any portion used for waterworks purposes. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 20 line transformers, of 100 k.w. total capacity. Number of consumers, 285; connected load, 200 k.w. for lighting and 25 k.w. in appliances. **Rates:** Meter lighting rate, 10 cents per k.w.h., with meter rental and a minimum charge; flat rate, $3 per lamp per year. Street lighting: tungsten and nitro lamps, from 60 w. to 250 w.

KINGSTON, Frontenac Co. (22,265*). Supplied under municipal control, being obtained principally from the Central Ontario system of the Hydro-Electric Power Commission, but also from a private hydro-electric plant at Kingston Mills. (See under Kingston Mills.) A steam plant, which formerly carried the entire load, is now used as an auxiliary. Portsmouth is also supplied from the Kingston system. **Hydro Substation:** Two 750-k.v.a. station transformers step voltage down from 44,000 v. to 2,400 v., 3 ph., 60 cy., approximately 1,500 h.p. being taken through these at $28 per h.p.-year at 2,400 v. **Kingston Mills Substation:** Property of Gananoque Electric Light and Water Supply Co., and used to receive the energy supplied from the latter's hydro-electric plant at Kingston Mills and purchased by the municipal system at ¾ cent per k.w.h. Equipment: three 200-k.v.a. station transformers step voltage down from 13,200 v. to 2,400 v., 3 ph., 60 cy. **Steam Plant:** Brick and stone building, 89 x 102 ft., containing seven 110-h.p. return tubular boilers, at 127 lbs. pressure, and one 500-k.w. steam turbine unit at 3 ph., 60 cy., 2,200 v. Fuel: bituminous slack coal, at $6.85 per ton. Plant installed in 1892; valued at $61,024. Cost of generation, previous to the introduction of hydro, when the steam plant was carrying practically the entire load, was 1¼ cents per k.w.h. Output divided, 91 per cent for lighting, 1 per cent for motive power and 8 per cent for electric railway; load factor, 52 per cent. **Distribution:** 35 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 500 v.; 205 line transformers, of from 1 to 30 k.w. capacity. Number of consumers, 2,181. Distribution system valued at $106,029. **Rates:** Meter lighting rate, from 2½ to 10 cents per k.w.h., according to consumption; power rate, from 1 cent to 3 cents per k.w.h., plus a fixed charge of $1 per h.p. per month. Street lighting: magnetite arc lamps, at $60 to $75 per lamp per year.

KINGSTON MILLS, Frontenac Co. The Gananoque Electric Light and Water Supply Co. operates a hydro-electric plant, transmitting power to Kingston, 6 miles distant, and Gananoque, 14 miles distant. **Hydro-Electric Plant:** Head works include a concrete and earth-filled dam and wing walls, maximum height 25 feet, with a penstock, 250 feet long, leading to a concrete power house 36 x 62 ft.; available head, 45 feet. Equipment: one 900-h.p. turbine, direct connected to a 600-k.v.a., 3-ph., 60-cy., 2,300-v. generator, and three 200-k.v.a. station transformers, stepping the voltage up from 2,300 v. to 13,200 v. Plant

gives a continuous service; was installed in 1915; cost of installation, $100 per k.w. **Transmission Lines:** Two transmission lines extend from this plant, one to Gananoque, 14 mi., and the other to Kingston, 6 mi. Both lines operate at 13,200 v., 3 ph., 60 cy. They consist of a single circuit of three aluminium conductors, supported by pin-type insulators on wooden poles. Lightning protection, aluminium cell arresters at each end.

KINGSVILLE, Essex Co. (1,633*). Supplied under control of Ontario Hydro-Electric Power Commission (Essex County Light and Power Co.). Energy transmitted from steam plant at Sandwich, the system being included under latter.

KIRKLAND LAKE, Timiskaming Dist. Supplied by the Northern Ontario Light and Power Co. (See under Cobalt.) The sub-station is usually supplied from the Cobalt system, but there is also a transmission line from the Englehart system. **Substation:** Two 1,250-k.v.a., 3-ph. transformers step voltage down from 44,000 v. to 2,400 v. at 60 cy. for the energy from the Cobalt system, and three 250-k.v.a. transformers step voltage down from 33,000 v. to 2,200 v. for the energy from the Englehart system. The load taken, which is practically all for power, is 1,500 h.p. **Distribution:** 3 mi. of pole line, with primaries at 2,200 v., supplying power to eight mines in the district. **Rates:** Meter rate, from 1 cent to 3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.

KITCHENER, Waterloo Co. (19,695†). Supplied under municipal control, 5,000 h.p. at $20 per h.p.-year at 13,200 v. being obtained from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 500-k.w., twelve 200-k.w. and nine 100-k.w. station transformers step voltage down from 13,200 v. to 2,300 v., 3 ph., 25 cy., and two 225-k.w. rotary converters for electric railway service. Load divided, 43 per cent for lighting, 50 per cent for power and 7 per cent for electric railway; load factor, 70 per cent. **Distribution:** 48 mi. of streets; with 2 mi. underground; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 164 line transformers, of 2,318 k.w. total capacity. Number of consumers, 2,867; connected load, 4,000 h.p. for lighting and 7,500 h.p. in motors. Distribution system valued at $365,755, including $70,216 for the substation. **Rates:** Domestic lighting rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·4 cent to 4 cents per k.w.h.; power rate, from 0·15 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent discount for power. Street lighting: 100-w. to 500-w. nitro lamps, at $9 to $33 per lamp per year.

LAKEFIELD, Peterborough Co. (1,033*). Supplied by the Lakefield Electric Light Co. from a hydro-electric plant on the Otonabee river, the dam being a portion of the Trent Canal system. **Hydro-Electric Plant:** The main dam, of timber, is 200 ft. long and 10 ft. high; a longitudinal timber dam, 800 feet long, forms a headrace, whence the water is led through a penstock 25 ft. long and 12 ft. wide to a frame power house 25 x 20 ft.; available head, 12 feet. Equipment: one 125-h.p. turbine, belted to a 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 100 h.p.; practically continuous service. Load divided, 75 per cent for lighting and 25 per cent for power. Plant purchased in 1907, and valued at $6,000; cost of generation, $13 per h.p.-year. **Distribution:** 6½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 13 line transformers, of from 2 k.w. to 15 k.w. capacity. Number of consumers, 150. Distribution system valued at $4,000. **Rates:** Flat rate, from $3.12 to $5.20 per 16-c.p. lamp per annum. Street lighting: 60-w. and 100-w. tungsten lamps, at $13 per lamp per year.

LAMBETH, Middlesex Co. (316†). Supplied under municipal control, 20 h.p. being supplied from the Delaware substation of the Niagara system of the Hydro-Electric Power Commission, at $46.56 per h.p.-year at 4,000 volts. **Distribution:** 1½ mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 5 line transformers, of 47 k.v.a. total capacity. Number of consumers, 68; connected load, 71 h.p. for lighting

and 35 h.p. in motors. Value of distribution system, $4,241. **Rates:** Domestic lighting rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, 1·2 to 12 cents per k.w.h.; power rate, from 0·15 cent to 5·4 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

LEAMINGTON, Essex Co. (3,604*). Supplied under control of Hydro-Electric Power Commission (Essex County Light and Power Co.). Energy transmitted from steam plant at Sandwich, the system being included under Sandwich.

LEHIGH MILL AND QUARRIES, Hastings Co. (near Point Anne). Supplied entirely, for power purposes, from the Central Ontario system of the Hydro-Electric Power Commission; amount taken, 3,535 h.p. at 600 volts. **Substation:** Four 750-k.v.a. and two 300-k.v.a. station transformers step voltage down from 44,000 v. to 600 v. at 3 ph., 60 cy.

LINDSAY, Victoria Co. (7,752*). Supplied under municipal control, 1,550 h.p. being taken from the Central Ontario system of the Hydro-Electric Power Commission. **Substation:** Three 750-k.v.a. station transformers step voltage down from 11,000 v. and 44,000 v. to 4,000 v., 3 ph., 60 cy.; output divided, 40 per cent for lighting and 60 per cent for power. **Distribution:** 35 mi. of streets, with 1 mi. underground; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 178 line transformers, of 2,555 k.w. total capacity. Number of consumers, 1,477; connected load, 1,153 k.w. for lighting and 2,303 h.p. in motors. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·167 cent to 2·33 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates are subject to 10 per cent discount, with an additional discount of 10 per cent for power. Street lighting: 100-w. incandescent lamps, enclosed arc lamps and magnetite arc lamps, at $12, $47.50 and $70 per lamp, respectively, per year.

LISKEARD, Timiskaming Dist. (1,700*). Supplied by the Northern Ontario Light and Power Co. (See under Cobalt.) **Substation:** Two 100-k.v.a. station transformers step voltage down from 11,000 v. to 2,200 v. The load is 125 k.w., divided equally between power and lighting. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 35 line transformers, of 255 k.w. total capacity. Number of consumers, 400; connected load, 100 k.w. for lighting, 255 h.p. in motors, and 85 k.w. in appliances. **Rates:** Meter lighting rate, 8 cents per k.w.h.; power or heating appliances, from 1 cent to 3 cents per k.w.h., according to consumption; flat rate for power, $50 per h.p.-year. Street lighting: enclosed arcs and 100-c.p. incandescent lamps, at $55 and $14.50 per lamp per year.

LISTOWEL, Perth Co. (2,291*). Supplied under municipal control, 200 h.p. at $37.40 per h.p.-year at 4,000 volts being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 100-k.v.a. station transformers step voltage down from 26,400 v. to 4,000 v. Output divided, 59 per cent for lighting and 41 per cent for power. **Distribution:** 5½ mi. of streets, with 1,800 ft. underground; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 27 line transformers, of 330 k.w. total capacity. Number of consumers, 332; connected load, 350 h.p. for lighting and 275 h.p. in motors. Distribution system valued at $23,000. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1 cent to 10 cents per k.w.h; power rate, from 0·15 cent to 3·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. and 350-w. lamps, at $12.50 and $75 per lamp per year.

LITTLE CURRENT, Manitoulin Dist. (1,137*). Supplied, under municipal control, from a steam power plant. **Power Plant:** Concrete building, 40 x 40 ft., containing two 100-h.p. return tubular boilers, at 100 lbs. pressure, and a 100-h.p. compound condensing engine,

belted to a 75-k.w., 2-ph., 60-cy., 2,200-v. generator. Maximum load, 25 h.p. Fuel: bituminous run-of-mine coal; yearly consumption, 600 tons, at $5. Cost of power for operation alone, exclusive of overhead charges, 15 cents per k.w.h. Plant gives night service only; installed in 1913, valued at $26,000, including distribution system. **Distribution:** 4½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 13 line transformers, of 42 k.w. total capacity. Number of consumers, 126; connected load, 60 k.w. for lighting. **Rates:** Meter rate, 15 cents per k.w.h., with a minimum charge and a meter rental. Street lighting: 80-c.p. and 250-c.p. nitro lamps, at $23 per 80 c.p. per year.

LONDON, Middlesex Co. (57,301*). Supplied under municipal control and to a limited extent by the Helena Costume Co.

Municipal System—Energy obtained from the Niagara system of the Hydro-Electric Power Commission, 10,000 h.p. at $21 per h.p.-year at 13,200 v. being taken. **Substations:** 6 substations, situated in different parts of the city, contain 43 station transformers, of which 18 have a capacity of 250 k.v.a. each, 16 of 200 k.v.a., 6 of 185 k.v.a. and 3 of 110 k.v.a., all single-ph. units, operating at 3 ph., 25 cy., stepping the voltage down from 13,200 v., in some cases to 2,300 v., and in others to 575 v. to be used directly for power. There are also two motor-generator sets and 5 rotary converters, with total aggregate capacity of 2,440 k.w. in units ranging from 70 k.w. to 500 k.w., the direct current being used for both railway purposes and industrial power. Load divided, 37 per cent for lighting, 54 per cent for power and 9 per cent for electric railway. **Distribution:** 139 mi. of streets, including the 13,200-v. trunk lines; primaries are at 2,300 v. and secondaries at 110 v. to 550 v.; power is also distributed at 250 v. to 500 v., d.c.; 198 line transformers, of from 2 k.w. to 50 k.w. capacity. Number of consumers, 9,411; connected load, 12,900 h.p. for lighting and 15,700 h.p. in motors. Distribution system valued at $825,360, including $168,400 for the substations. **Rates:** Domestic lighting rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·4 cent to 4 cents per k.w.h.; power rate, from 0·133 cent to 1·67 cents, plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent discount for power. Street lighting: 75-w. to 500-w. nitro lamps, at $8 and $64.25 per lamp per year, respectively.

Helena Costume Company—This system is supplied from a steam-power plant connected with the factory. **Power Plant:** Brick building, 100 x 100 ft., equipped with four 125-h.p. return tubular boilers with underfeed stokers; also three generating units, comprising a 300-h.p. and a 150-h.p. engine, direct connected, respectively, to a 250-k.w. and a 75-k.w. generator and a 250-h.p. engine, belted to two 85-k.w. generators. All energy is direct current, at 115 v. and 230 v. Maximum load, 350 k.w. Plant gives a continuous service; was installed in 1903, and remodelled in 1913; present value, about $70,000. The latter figure includes the system of electric distribution and also the piping for the distribution of exhaust steam heat; the company also supplies the latter commodity. The cost of electric generation, taking into consideration the revenue from the exhaust steam heat, is approximately ½ cent per k.w.h. **Distribution:** 2 mi. of streets, distribution being effected at 125 v. and 250 v., direct current. Connected load, approximately 300 k.w. for lighting and 300 k.w. for power. **Rates:** Similar to those of the municipal system.

L'ORIGNAL, Prescott Co. (1,163*). Supplied by K. Marston, 23 h.p. at $20 per h.p. per annum at 2,080 v. being obtained from the Hawkesbury substation of the Hawkesbury Electric Light and Power Co. (see Hawkesbury). **Distribution:** 2 mi. of streets; primaries at 2,080 v. and secondaries at 110 v.; 6 line transformers, of 37 k.w. total capacity. Number of consumers, 60. Distribution system valued at $3,000. **Rates:** Meter rate, 10 cents per k.w.h.; monthly flat rate, 30 cents per 16-c.p. lamp. Street lighting: 60-w. lamps, at $12 per lamp per year.

LUCAN, Middlesex Co. (643*). Supplied under municipal control, 129 h.p. at $47.74 per h.p.-year at 4,000 v. being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 75-k.w. transformers step voltage down from 13,200 v. to

4,000 v., 3 ph., 25 cy. Earnings divided, 50 per cent for lighting and 50 per cent for power. **Distribution:** 5 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 12 line transformers, of 110 k.w. total capacity. Number of consumers, 147; connected load, 35 h.p. for lighting and 150 h.p. in motors. Distribution system valued at $12,231. **Rates:** Domestic lighting rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·2 to 12 cents per k.w.h.; power rate, from 0·15 cent to 5·4 cents per k.w.h. All rates are subject to a discount of 10 per cent. Street lighting: 100-w. lamps, at $15 per lamp per year.

LUCKNOW, Bruce Co. (922*). Supplied by Walter Stewart & Son, from a steam-power plant. **Steam-power Plant:** Frame building, 30 x 42 ft., contains a 100-h.p. return tubular boiler at 100 lbs. pressure, and a 100-h.p. engine belted to two 25-k.w., 110-v., d.c. generators, and a 10-k.w. series arc generator. Maximum demand, 32 k.w. Fuel: coal and wood; yearly consumption, 250 tons of coal at $12 and 200 cords of wood at $6. Plant gives a night service only, was installed in 1897, and is valued at $7,865. **Distribution:** 3 mi. of streets; distribution effected at 110 v., d.c. Number of consumers, 70; connected load, 50 k.w. Distribution system valued at $2,550. **Rates:** Meter rate, 15 cents per k.w.h., plus a meter rental; monthly flat rate, 50 cents per 40-w. lamp. Street lighting: enclosed arc lamps, at $50 per lamp per year.

LYNDEN, Wentworth Co. Supplied under public control, 85 h.p. being taken at $33 per h.p.-year at 4,000 volts from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 75-k.w. station transformers, stepping the voltage down from 13,200 v. to 4,000 v., 3 ph., 25 cy. Earnings divided, 57 per cent for lighting and 43 per cent for power. **Distribution:** 1¾ mi. of streets; primaries at 2,200 v. and 4,000 v. and secondaries at 110 v. and 220 v.; 7 line transformers, of 56 k.w. total capacity. Number of consumers, 35; connected load, 45 h.p. for lighting and 65 h.p. in motors. Distribution system valued at $4,436. **Rates:** Domestic lighting rate, 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

LYNDHURST, Leeds Co. Supplied by Geo. E. Roddick, from a local hydro-electric plant on the Gananoque river. The system also supplies Delta, 5 miles distant. **Hydro-electric Plant:** A masonry bridge serves as a dam, from which a concrete flume 30 ft. wide by 16 ft. deep leads to the power house; available head, 17½ ft. Equipment: one 200-h.p. turbine, belted to a 30-k.w., 3-ph., 60-cy., 2,200-v. generator. The plant, which gives a night service only, was installed in 1912. **Distribution:** 1 mi. of streets, with an additional supply line for Delta, 5 mi.; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 30 k.w. total capacity. Number of consumers, 90; connected load, 25 k.w. for lighting and 30 h.p. in motors. **Rates:** Flat rate, 40 cents per 25-w. lamp per month; meter rate, 12 cents per k.w.h.

MADOC, Hastings Co. (1,114*). Supplied, under municipal control, from the Central Ontario system of the Hydro-Electric Power Commission, 650 h.p. being taken, the Gillespie Co. and Sulphide Ore being also included. **Substation:** Three 300-k.v.a. station transformers step voltage down from 44,000 v. to 4,000 v., 3 ph., 60 cy. **Distribution:** 5 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 6 line transformers, of 150 k.w. total capacity. Number of consumers, 210; connected load, power alone, 625 h.p. **Rates:** Flat lighting rate, from 4 to 10 cents per watt per year; meter rate, 10 cents per k.w.h.; special flat rates for appliances. Street lighting: 60-w. lamps, at $5 per lamp per year.

MARKDALE, Grey Co. (904*). Supplied, under municipal control, from the Eugenia system of the Hydro-Electric Power Commission, 75 h.p. at $23.24 per h.p.-year at 2,200

volts being taken. System supplied directly at this voltage from the Eugenia power plant. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 21 line transformers, of 200 k.w. total capacity. Number of consumers, 183; connected load, 40 k.w. for lighting and 40 h.p. in motors. Distribution system valued at $11,137, of which $781 is for the distributing station. **Rates:** Domestic meter rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 2·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 150-c.p. lamps, at $12 per lamp per year.

MARKHAM, York Co. (1,045*). Supplied, under municipal control, from a steam-power plant. **Steam Plant:** The brick building, 50 x 60 ft., also contains the water-works plant. The equipment includes a 100-h.p. return tubular boiler, at 75 lbs. pressure, which is also used for water-works purposes, and a 65-h.p. engine, belted through a countershaft to a 72-k.w., 2-ph., 133-cy., 1,100 v. generator. Maximum load, 30 h.p. Fuel: bituminous lump coal, approximately 275 tons being used yearly for electric operations, at $8.50 per ton. The plant, which was first installed in 1890, gives a night service only, and, including the system of distribution, is valued at $10,000. **Distribution:** 4 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 10 line transformers, of 32 k.w. total capacity. Number of consumers, 150; connected load, 52 k.w. for lighting and 10 k.w. in appliances. **Rates:** Meter rate, 10 cents per k.w.h., plus a meter rental. Street lighting: 100-w. nitro and tungsten lamps, at $16 per lamp per year.

MARKSVILLE, Algoma Dist. (200†). Supplied by the Stone Lumber Co. from a steam-power plant, operated in connection with the mill. **Power Plant:** An engine operates a 30-k.w., 125-cy. generator, steam being supplied from the mill boilers. Fuel: mill refuse. Plant installed in 1911. **Distribution:** A few consumers only supplied. **Rates:** Flat rate, 50 cents per lamp per month. Street lighting: 40-w. lamps.

MARMORA, Hastings Co. (826*). Supplied under municipal control, from a hydro-electric plant on Crow river in the village. **Hydro-electric Plant:** Two stone-filled crib dams, 160 ft. and 62 ft. in length, respectively, one on each side of an island. A head-race leads from the latter dam to a frame power house 30 x 50 ft.; available head, 13 ft. Equipment: one 100-h.p. turbine, belted to a 100-k.w., single-ph., 125-cy., 1,040-v. generator. Maximum demand, full capacity of the plant, night service only. Plant installed in 1901 and purchased by the municipality in 1910; present value, $6,000, including distribution system. **Distribution:** 10 mi. of streets; primaries at 1,040 v. and secondaries at 104 v.; 20 line transformers, of from 1 k.w. to 5 k.w. capacity. Number of consumers, 116. **Rates:** Flat rate, $2.25 per year per 25-w. lamp, with discounts of from 10 per cent upward, according to number. Street lighting: 60-w. and 100-w. nitro lamps, at an average charge of $10 per lamp per year.

MATTAWA, Nipissing Co. (1,415*). The Mattawa Electric Light and Power Co distributes electric energy generated at its hydro-electric plant on the Mattawa river, 2½ miles distant. **Hydraulic Plant:** Concrete and crib-work dam 160 ft. long and 16 ft. high, from which a short steel and concrete penstock, 8½ ft. in diam., leads to a brick power house 21 x 30 ft.; available head, 13 ft. Equipment: one 216-h.p. turbine, belted to a 200-k.w., 3-ph., 60-cy., 2,200-v. generator; maximum demand, 100 h.p., divided, 80 per cent for lighting and 20 per cent for power. Plant installed in 1899; value, $20,000; night service only; cost of generation, $14.50 per h.p.-year. **Distribution:** Effected directly from hydro-electric plant, the trunk line operating at 2,200 volts. The system covers 6½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 17 line transformers, of from 2½ k.w. to 10 k.w. capacity. Number of consumers, 127; connected load, 75 k.w. for lighting alone. Distribution system valued at $3,919. **Rates:** Domestic flat rate, from 25 to 50 cents per 16-c.p. per month, according to number, while the meter rate is 13 cents per k.w.h.; power rate, $15 per h.p.-year. Street lighting: enclosed arc lamps, at $3.50 per lamp per month.

McIRVINE, Municipality of (near Fort Frances), Rainy River Dist. (124*). Supplied under municipal control, being obtained from the Ontario and Minnesota Power Co. at 3 cents per k.w.h. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; three line transformers, of 13 k.w. total capacity. Number of consumers, 27; connected load, 12 k.w. for lighting. System valued at $1,800. **Rates:** Meter rate, 5 cents per k.w.h.

MEAFORD, Grey Co. (2,649*). Supplied by the Georgian Bay Milling and Power Co. **Hydro-electric Plant:** Situated on Bighead river, and comprises a part gravel and stone crib-work and part concrete dam, 540 ft. long and 7 ft. high, whence a wood-stave pipe, 1,100 ft. long and from 5 to 6 ft. diam., leads to a concrete power house 40 x 30 ft.; available head, 50 ft. Equipment: one 400-h.p. turbine, belted to a 200-k.w., 3-ph., 60-cy., 2,300-v. generator. Plant gives continuous service, was installed in 1916 and is valued at $92,000. The water-power rights are estimated at 2,000 h.p., including an additional descent of 60 ft., giving a total possible head of 110 ft. **Distribution:** 16 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 27 line transformers, of from 5 k.w. to 15 k.w. capacity. Number of consumers, 427; connected load, 450 k.w. Distribution system valued at $32,000. **Rates:** Meter lighting rate, 7 cents per k.w.h., less 10 per cent discount; for appliances, 4 cents per k.w.h.; for power, from 0·15 cent to 3·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p., less discounts of 10 plus 10 per cent. Street lighting: enclosed arc lamps and 90-w. lamps, at $40 and $10.70 per lamp per year, respectively.

MELVILLE, Peel Co. Supplied by the Cataract Electric Co. See under Orangeville.

MERLIN, Kent Co. (400†). Supplied by James McHardy, from a gas-power plant. **Power Plant:** Cement block building, 16 x 32 ft.; one 50-h.p. gas engine, belted to a 40-k.w., 110-v., d.c. generator. Natural gas is used as fuel, the cost per month being $20. Maximum demand, 12 k.w.; night service only. Plant installed in 1913, and valued at $5,000. **Distribution:** 1¼ mi. of streets; distribution effected at 110 v., d.c. Number of consumers, 68. **Rates:** Meter rate, 15 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $12 per lamp per year.

MERRICKVILLE, Grenville Co. (837*). Supplied by the Rideau Power Co., principally for power purposes, from a hydro-electric plant on the Rideau river in the village. **Hydro-electric Plant:** The dam, which forms part of the Rideau canal works, is of concrete, 600 ft. long and 22 ft. high; two steel flumes, of which only one is in use, 8 ft. diam. and 70 ft. long, lead to a brick power house 40 x 50 ft.; available head, 26½ ft. **Equipment:** one 750-h.p. turbine, direct connected to a 562-k.v.a., 3-ph., 60-cy., 600-v. generator. Maximum load, 120 k.w. Plant gives a continuous service, was installed in 1915, and is valued at $60,000. **Distribution:** 7 mi. of streets; primaries at 600 v. and secondaries at 110 v.; 10 line transformers, of 50 k.w. total capacity, the latter being used only for lighting. Number of consumers, 102. Distribution system valued at $8,000. **Rates:** Meter lighting rate, 10 cents per k.w.h., less 20 per cent discount; flat power rate, $18 per h.p.-year. Street lighting: 100-w. nitro lamps, at $20 per lamp per year.

MERRITTON, Lincoln Co. (2,358*). Supplied under municipal control, 200 h.p. at $17 per h.p.-year being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 80-k.v.a. transformers step voltage down from 12,000 v. to 2,200 v., 3 ph., 25 cy. Average load factor, 54·2 per cent. **Distribution:** 8½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 28 line transformers, of from 1 k.w. to 20 k.w. capacity. Number of consumers, 447; connected load, 175 k.w. for lighting, 40 k.w. for appliances, and 171 k.w. in motors. Distribution system valued at $12,000. **Rates:** Meter lighting rate, 3 cents per k.w.h.; flat power rate, from $10 to $19.50 per h.p. per annum. Street lighting: 40-w. and 100-w. tungsten lamps, at $5 per lamp per year.

MICHIPICOTEN, Algoma Dist. Algoma Power Co. has a hydro-electric plant at High falls on the Michipicoten river, 8 miles from Michipicoten harbour, used almost exclusively to supply power to Helen Mine and as a stand-by to Magpie Mine. (See also under Helen Mine). **Hydro-electric Plant:** Water is diverted directly from the river through a 7-ft. circular wooden flume, 350 ft. long, thence through a 6-ft. steel conduit, 235 ft. long, to a concrete power house 35 x 45 ft.; available head, 128 ft. Equipment: one 700-h.p. and one 1,000-h.p. turbine direct connected, respectively, to a 450-k.w. and a 600-k.w. generator; energy generated at 3 ph., 60 cy., 10,000 v. Maximum load, 525 h.p., but at times reaches 1,060 h.p. Plant installed in 1905, gives a continuous service, and is valued at $207,000. **Transmission Line:** From the plant to Helen Mine, 10 miles, operating at 10,000 v., 3 ph., 25 cy. The line consists of a single circuit of three copper wires, both No. 4 and No. 1 being used, supported by pin-type insulators on wooden poles. Lightning protection, electrolytic and gap arresters. **Distribution:** All energy is supplied in bulk to operate mines, and is sold at $32 per h.p. per year.

MIDLAND, Simcoe Co. (7,109*). Supplied, under municipal control, from the Severn system of the Hydro-Electric Power Commission, 1,200 h.p. at $19 per h.p.-year at 2,200 v. being taken. **Substation:** Three 300-k.v.a. transformers step voltage down from 22,000 v. to 2,300 v., 3 ph., 60 cy. Output divided, 40 per cent for lighting and 60 per cent for power. **Distribution:** 16 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 100 line transformers, of from 2½ k.w. to 40 k.w. capacity. Number of consumers, 1,000; a connected load for appliances alone of 600 k.w., and for motors alone of 1,200 h.p. Distribution system valued at $45,000. **Rates:** Domestic meter rate, from 1·25 to 2·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·5 cent to 5 cents per k.w.h.; for power, from 0·1 cent to 1·1 cents per k.w.h., plus a monthly fixed charge of 75 cents per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. and 750-w. nitro lamps, at $10 and $30 per lamp per year.

MILDMAY, Bruce Co. Supplied by the Mildmay Electric Co., 27 h.p. at $32 per h.p.-year at 2,300 volts being obtained from the Walkerton Electric Co. (see under Walkerton). **Distribution:** 2½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 8 line transformers, of 25 k.w. total capacity. Number of consumers, 92; connected load, 45 k.w. for lighting, 12 h.p. in motors and 15 k.w. in appliances. The system is valued at $4,600. **Rates:** Meter lighting rate, 10 cents per k.w.h., less 10 per cent discount, with a minimum charge and a meter rental; flat power rate, $32 per h.p.-year for restricted use. Street lighting: 60-w. and 80-w. tungsten lamps, at $12 per lamp per year.

MILLBROOK, Durham Co. (746*). Supplied under municipal control, from the Central Ontario system of the Hydro-Electric Power Commission, 38 h.p. being taken. **Substation:** One 100-k.v.a. station transformer steps the voltage down from 44,000 v. to 2,400 v.; output divided, 90 per cent for lighting and 10 per cent for power. **Distribution:** 3 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. and 220 v.; 11 line transformers, of 55 k.w. total capacity. Number of consumers, 165; connected load, 174 k.w. for lighting and 20 h.p. in motors. **Rates:** Domestic lighting rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 4·2 cents per k.w.h.; plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. lamps and enclosed arc lamps at $12 and $60 per lamp per year.

MILLE ROCHES, Stormont Co. Supplied by St. Lawrence Power Co. See under Cornwall.

MILTON, Halton Co. (2,072*). Supplied under municipal control, 300 h.p. at $28 per h.p.-year at 13,200 volts being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 250-k.v.a. transformers step voltage down from 13,200 v.

to 2,200 v., 3 ph., 25 cy. Output divided, 16 per cent for lighting and 84 per cent for power. **Distribution:** 12 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 16 line transformers, of 115 k.w. total capacity. Number of consumers, 274; connected load, 104 k.w. for lighting, 107 k.w. for appliances and 343 k.w. in motors. **Rates:** Domestic meter rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 2·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $11 per lamp per year.

MILVERTON, Perth Co. (929*). Supplied under public control, 200 h.p. at $35.63 per h.p.-year at 4,000 volts being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 75-k.v.a. transformers step voltage down from 26,400 v. to 4,000 v., 3 ph., 25 cy. Load divided, 24 per cent for lighting and 76 per cent for power. **Distribution:** 2 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 550 v.; 12 line transformers, of 174 k.w. total capacity. Number of consumers, 130; connected load, 45 h.p. for lighting and 225 h.p. in motors. Distribution system valued at $10,000. **Rates:** Domestic meter rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 3·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12.50 per lamp per year.

MIMICO, York Co. (2,004*). Supplied from Etobicoke system. See under Etobicoke.

MINE CENTRE, Rainy River Dist. Supplied by H. C. McMahon & Co., from an oil engine plant. **Power Plant:** A frame building contains a 6-h.p. engine, belted to a 5-k.w., 80-v., d.c. generator, and a storage battery of 280 amp.-hours capacity. Fuel: kerosene oil, yearly consumption, 28 bbls. Plant operates only during a portion of the day but continuous service is supplied by means of the storage battery. It was installed in 1912. **Distribution:** The system is limited to the immediate neighbourhood and only supplies a few consumers. **Rates:** Flat rate, from $1 to $2.50 per lamp per year. Street lighting: 25-w. lamps, at $1.25 per lamp per year.

MITCHELL, Perth Co. (1,656*). Supplied under municipal control, 150 h.p. at $36 per h.p.-year at 26,400 volts being taken from the Niagara system of the Hydro-Electric Power Commission. A municipal steam plant is used in emergencies. **Steam Plant:** A brick building 54 x 54 ft. contains two boilers, 120 h.p. and 100 h.p., respectively, at 120 lbs. pressure, and a 120-h.p. engine belted through a countershaft and clutch to a 75-k.w., 2-ph., 60-cy., 1,100-v. generator. The building also contains the waterworks equipment, which may be operated either by a 120-h.p. synchronous motor or by a steam pump. Fuel: bituminous coal, but practically only used in connection with the waterworks. Steam plant installed in 1890; electric portion valued at $1,500. **Substation:** Three 75-k.w. transformers step voltage down from 26,400 v. to 1,100 v., 3 ph., 25 cy. Earnings divided, 69 per cent for lighting and 31 per cent for power. **Distribution:** 7¼ mi. of streets; primaries at 1,100 v. and 550 v. and secondaries at 110 v.; 19 line transformers, of 148 k.w. total capacity. Number of consumers, 320; connected load, 345 h.p., for lighting and 242 h.p. in motors. Distribution system valued at $8,500. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 3·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional discounts for restricted power. Street lighting: 100-w. lamps, at $12 per lamp per year.

MOOREFIELD, Wellington Co. Supplied under public control, from the Niagara system of the Hydro-Electric Power Commission. The distribution system also includes Drayton. See under Drayton.

MORRISBURG, Dundas Co. (1,415*). Supplied under municipal control. The municipality owns two local hydro-electric plants, but only one of these is operated to supply the village. The Williamsburg system is also supplied from the same plant. Water for both plants is derived from the St. Lawrence canal system at Morrisburg. **No. 1 Hydro-electric Plant:** This plant, at present being used, is in a brick building, 30 x 40 ft. Available head, 10 ft. Equipment: two 150-h.p. turbines, belted to the same 190-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 250 h.p., divided, approximately, 67 per cent for lighting and 33 per cent for power. Plant installed in 1900, value $32,000. **No. 2 Hydro-electric Plant:** Not at present used; available head, 10 ft. A concrete building, 30 x 35 ft., contains four 350-h.p. turbines, all belted to the same 825-k.w., 3-ph., 60-cy., 2,300-v. generator. Plant installed in 1905, value, $76,000. **Distribution:** 10 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 42 line transformers, of 220 k.w. total capacity. Number of consumers, 400; connected load, 200 k.w. for lighting and 100 h.p. in motors. **Rates:** Flat lighting rate, from $1 to $2 per lamp per annum, according to uses; power rate, $7.50 per h.p.-year for restricted use. Street lighting: 80-w. lamps.

MOULINETTE, Stormont Co. (200†). Supplied by the St. Lawrence Power Co. See under Cornwall.

MOUNT ALBERT, York Co. Supplied by A. & C. Dike, from a producer-gas plant. **Power Plant:** A frame building 45 x 60 ft. contains a gas producer, supplying a 65-h.p. engine, which is direct connected to a 30-k.w., 250-v., d.c. generator. Fuel: coal; yearly consumption, 80 tons, at $10. Plant gives a night service only, was installed in 1911 and is valued at $6,500. **Distribution:** 2¼ mi. of streets; distribution effected at 250 volts, d.c. Number of consumers, 50; connected load, 15 k.w. for lighting. Distribution system valued at $1,500. **Rates:** Flat rate, 25 cents per month per 16-c.p. lamp. Street lighting: 32-c.p. lamps, at $14.30 per lamp per year.

MOUNT BRYDGES, Middlesex Co. Supplied under public control, 25 h.p. at $46.56 per h.p.-year at 4,000 volts being taken from the Deleware substation of the Niagara system of the Hydro-Electric Power Commission. Earnings divided, 63 per cent for lighting and 37 per cent for power. **Distribution:** 2 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 7 line transformers, of 100 k.w. total capacity. Number of consumers, 72; connected load, 75 h.p. for lighting and 26 h.p. in motors. Distribution system valued at $4,280. **Rates:** Domestic meter rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1·2 to 12 cents per k.w.h.; for power, from 0·15 cent to 5·4 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

MOUNT DENNIS, York Co. See under West Toronto.

MOUNT FOREST, Wellington Co. (1,941*). Supplied under municipal control, 110 h.p. at $34.51 per h.p.-year at 2,200 volts being taken from the Eugenia system of the Hydro-Electric Power Commission. **Substation:** Three 100-k.v.a. transformers step voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. Output divided, 65 per cent for lighting and 35 per cent for power. **Distribution:** 14 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 26 line transformers, of from 5 k.w. to 25 k.w. capacity. Number of consumers, 270; connected load, 80 k.w. for lighting and 133 h.p. in motors. Distribution system valued at $29,055, including $687 for the substation. **Rates:** Domestic meter rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional discounts for restricted power. Street lighting: 60-c.p. nitro lamps, at $10 per lamp per year.

NAPANEE, Lennox and Addington Co. (2,881*). Supplied under public control, 315 h.p. being taken from the Central Ontario system of the Hydro-Electric Power Commission. **Substation:** Two 300-k.v.a. station transformers step voltage down from 44,000 v. to 4,000 v.; output divided, 62 per cent for lighting and 38 per cent for power. **Distribution:** 32 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. to 550 v.; 61 line transformers, of 569 k.w. total capacity. Number of consumers, 561; connected load, 735 k.w. for lighting and 451 h.p. in motors. **Rates:** Domestic lighting rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·167 cent to 2·33 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent discount for power. Street lighting: 100-c.p. lamps and enclosed arc lamps, at $14 and $50 per lamp per year.

NEUSTADT, Grey Co. (470*). Supplied from the Hanover system. See under Hanover.

NEWBURG, Lennox and Addington Co. (144*). Supplied from the Camden East system. See under Camden East.

NEWCASTLE, Durham Co. (611*). Supplied under public control, 25 h.p. being taken from the Central Ontario System of the Hydro-Electric Power Commission. **Substation:** One 100-k.v.a. station transformer steps voltage down from 44,000 v. to 2,400 v., practically the entire output being for lighting. **Distribution:** 3 mi. of streets; primaries at 2,400 v. and secondaries at 110 v.; 10 line transformers of 28 k.w. total capacity. Number of consumers, 144; connected load, 94 k.w. for lighting and 3 h.p. in motors. **Rates:** Domestic lighting rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. lamps, at $12 per lamp per year.

NEW HAMBURG, Waterloo Co. (1,543*). Supplied under municipal control, 200 h.p. at $32 per h.p.-year at 2,200 volts being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 75-k.w. station transformers step voltage down from 13,200 v. to 2,200 v. at 3 ph., 25 cy. Earnings divided, 71 per cent for lighting, 23 per cent for power and 6 per cent for miscellaneous. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 16 line transformers of from 5 k.w. to 25 k.w. capacity. Number of consumers, 362; connected load, 300 h.p. in lighting and 260 h.p. in motors. **Rates:** Domestic meter rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·15 cent to 3·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $9 per lamp per year.

NEWMARKET, York Co. (3,340*). Supplied under municipal control, 150 h.p. at $25.50 per h.p.-year at 4,400 and 2,200 volts being obtained from the Toronto and York Radial Railway. **Distribution:** 8½ mi. of streets; primaries at 4,400 v. and 2,200 v. and secondaries at 110 v.; 35 line transformers, of from 5 k.w. to 10 k.w. capacity. Number of consumers, 545; connected load, 325 k.w. for lighting and 80 h.p. in motors. Distribution system valued at $30,000. **Rates:** Domestic meter rate, from 1½ to 3 cents per k.w.h., with a minimum monthly charge; power rate, from ¼ cent to 2½ cents per k.w.h., plus a service charge of $1 per h.p. per month. Power rates are subject to 20 per cent discount. Street lighting: 60-w. and 100-w. lamps, at $9.25 per lamp per year.

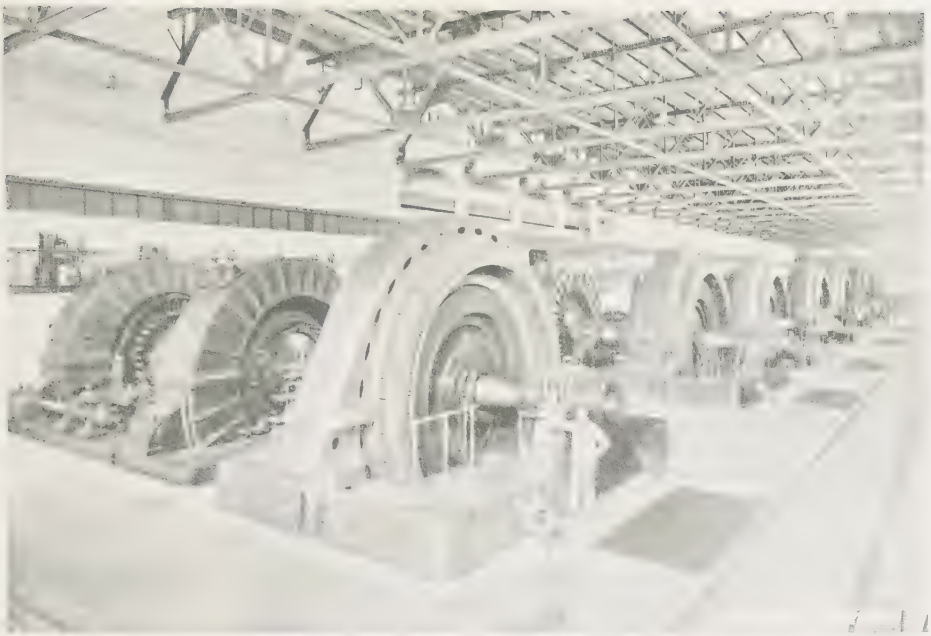
NEW TORONTO, York Co. (1,423*). Obtained from the Niagara system of the Hydro-Electric Power Commission; 1,000 h.p. being taken at $27 per h.p.-year at 2,200 volts. **Substation:** Three 750-k.v.a. station transformers step voltage down from 13,200 v. to

2,200 v. at 3 ph., 25 cy. Earnings divided, 20 per cent for lighting and 80 per cent for power. **Distribution:** 12 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 44 line transformers, of 2,469 k.v.a. total capacity. Number of consumers, 226; connected load, 265 h.p. for lighting and 4,970 h.p. in motors. Distribution system valued at $17,963. **Rates:** Domestic meter rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·167 cent to 2·33 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent discount for power. Street lighting: 100-w. lamps, at from $12 to $15 per lamp per year.

NIAGARA FALLS, Welland Co. (11,715*). Several large hydro-electric plants derive energy from the falls, the three principal ones being those of the Hydro-Electric Power Commission (Ontario Power Co.), the Toronto Power Co. and the Canadian Niagara Power Co. The local distribution is under municipal control, being supplied from the Niagara system of the Ontario Hydro-Electric Power Commission.

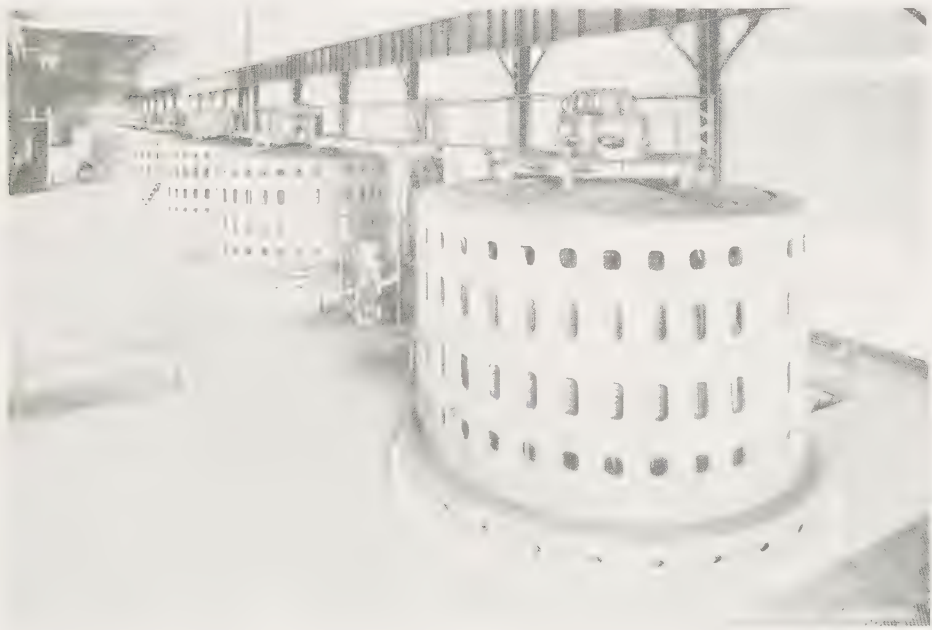
Hydro-Electric Power Commission Plant (Ontario Power Company)—Hydraulic Plant: Extensive headworks are situated about one mile above the falls, including the intake control works, 600 ft. long, and a submerged concrete dam, 725 ft. long, the latter deflecting the water from the outer forebay through a screen-house, 320 ft. long, to the inner forebay, thence through the gate-house. Both at the intake and screen house concrete curtains, extending 5 ft. to 9 ft. into the water, deflect floating ice or debris. Stoney gates, each weighing 40 tons, control the entrances to the three concrete, wood-stave and steel conduits; one conduit is 18 ft. diam., another has the same area with oblate cross section, and the third, wood-stave, 13 ft. diam. Each is 6,300 ft. long, and water is carried under pressure to 9-ft. penstocks, surge tanks being connected into the system at the downstream ends of the conduits. The 9-ft. penstocks convey the water 250 ft. to the concrete generating station, which is 800 x 80 ft. and is situated at the base of the cliff, below the Horseshoe fall. Installation includes 16 horizontal shaft units, operating under a head of about 180 ft.; seven of the turbines are of 12,500 h.p., three of which are each direct connected to a 7,500-k.w. generator; four others of the same capacity are connected to 9,000 k.w. generators; seven other units consist of 13,400-h.p. turbines with 10,000-k.w. generators, while the remaining two units consist of 15,000-h.p. turbines with 11,000 k.w. generators. Energy in all cases generated at 3 ph., 25 cy., 12,000 v. There are also two 1,600-h.p. units supplying 3-phase current to individual exciter units. While the installed capacity is higher, the present rated hydraulic capacity of the plant is 160,000 h.p., with an average daily maximum demand of about the same amount and an average yearly load factor of over 91 per cent. The total out-going load, including 20,000 k.w. now obtained from the Toronto Power Co., is approximately 180,000 horse-power. The station transformers are installed in a separate building, and comprise 18 of 3,000 k.v.a. capacity each, 12 stepping the voltage from 12,000 v. to 60,000 v., and 6 stepping the voltage from 12,000 v. to 30,000 v. The same building, which is the high tension distributing station for the entire output, also contains elaborate switching, bus-bar and other control arrangements, while the lightning protection consists of electrolytic arresters, choke coils and horn-gap arresters. The first units of the plant were put in operation in 1905. **Transmission Lines:** The lines directly from the power plant are not very extensive, but they supply other very extensive systems. These include the Hydro-Electric Power Commission of Ontario, to which 100,000 h.p. is supplied, and the Niagara, Lockport and Ontario Power Co., with an extensive network of transmission lines in the United States, to which, on the average, 60,000 h.p. is supplied. The 60,000-v. transmission lines supplying the Niagara, Lockport and Ontario Power Co. consist of two lines of steel towers, each tower supporting a single 3-ph. circuit, on pin-type insulators; 12,000-v. and 30,000-v. lines, used for local distribution, are carried on wooden poles. Power is supplied to the Niagara station of the Hydro-Electric Power Commission through underground cables at 12,000 v.

Canadian Niagara Power Co.—Hydraulic Plant: The plant is situated some 2,000 ft. above the falls, the head-works being adjacent to the power house. The scheme of develop-



ONTARIO HYDRO-ELECTRIC POWER COMMISSION.—HYDRO-ELECTRIC PLANT AT NIAGARA FALLS, ONT.

Formerly owned by Ontario Power Co. Largest in Canada. Total Capacity, 211,300 h.p.



TORONTO POWER CO.—INTERIOR OF HYDRO-ELECTRIC PLANT, NIAGARA FALLS, ONT.

ment is similar to that adopted later by the Toronto Power Co. and described thereunder. It includes an excavated intake canal, 406 ft. wide and 200 ft. long, protected at the entrance by a system of ice shields, and leading to the stone power house, which is 72 ft. x 580 ft. The ice shields consist of 12 stone piers, 31 ft. high, with steel curtains between them to divert the ice; they cover the total length of 406 ft. across the entrance. The turbines are installed in a deep pit, and operate under a head of 141 ft.; the water, which is admitted from the forebay through short penstocks, is discharged from the wheels through a long, underground, brick-lined tunnel of oblate section, 18 x 25 ft., with its outlet at the foot of the falls just above the Ontario Power Co. generating station. Long vertical shafts connect the turbines with the generators, which are installed in the power house on the ground level 122 ft. above the turbines. There are 10 main units, five of 10,000 h.p. each and five of 12,500 h.p. each, all generators being of 3-ph., 25-cy., 11,000-v. type. Maximum demand, 75,000 k.w. Nearly all the energy is sold in bulk at 11,000 v. or 22,000 v., the total output being divided as follows: Hydro-Electric Power Commission, 50,000 h.p.; Niagara Falls Power Co., 30,000 h.p. to 40,000 h.p.; the Buffalo General Electric Co. is supplied through the Niagara Falls Power Co., while the other consumers include the Norton Co., the Canadian Aloxite Co. and the Graphite Co., using the energy for electro-chemical purposes.

Toronto Power Co.—Hydraulic Plant: The development includes a concrete wing dam at the head of the falls, 785 ft. long and 27 ft. high. From this point the water is led to a wheel-pit 416 ft. long, 22 ft. wide, and 150 ft. deep, through 10-ft. steel penstocks, affording 140-ft. head. The power house, 500 x 70 ft., of imposing design, is of Indiana limestone and contains 11 units, each water wheel, which has a capacity of 15,000 h.p., being installed at the bottom of the pit, is direct connected through a long vertical shaft to a 10,000-k.w., 3-ph., 25-cy., 12,500-v. generator. The tail water is discharged through twin tunnels, 28 ft. diam., converging below the power house into a single tunnel 1,935 ft. long, with an outlet at the foot of the Horseshoe fall. The electrical equipment also includes very elaborate switchboard control devices, separate exciters mounted on each generator shaft, and two spare water-wheel-driven exciting units of 500 k.w. capacity each. The station transformers are contained in a separate building, there being 3 banks of 8,000 k.v.a. and 2 banks of 18,000 k.v.a. capacity each, stepping the voltage up to 60,000 v. for long distance transmission. The load on the plant is 93,250 k.w., with a load factor of 100 per cent, the plant being operated continuously. Plant first installed 1906; present value estimated at $18,000,000. **Transmission Lines:** Energy is transmitted to Toronto, over two double-circuit steel tower transmission lines, 80 mi., at 60,000 v., 3 ph., 25 cy., the standard spacing between towers being 400 ft. for one line and 650 ft. for the other. Each circuit is designed to transmit 20,000 k.v.a. with a loss not exceeding 20 per cent. The line consists of 198,000 c.m. hard drawn copper conductors, supported on pin-type insulators. It is protected against lightning by electrolytic arresters and against interruptions due to insulator failures by selective relays and Nicholson arc extinguisher. The transmission line system is valued at $6,600,000. The energy is sold to various consumers in Niagara Falls, Welland and Thorold, while the energy transmitted to Toronto is sold principally to the Toronto Electric Light Co. and the Toronto Railway Co.

International Railway Co. System—Hydro-electric Plant: This plant also derives energy from the falls, the development including an 8-ft. penstock, leading to a stone power house 100 x 61 ft., where a head of only 64 ft. is available. Equipment: two 1,000-h.p. turbines, belted to five 200-k.w., 500-v., d.c. generators and a 2,000-h.p. turbine, direct connected to a 1,500-k.w., 575-v., d.c. generator. Maximum demand, 1,600 k.w., which is used entirely for electric railway purposes, with an annual load factor of 29 per cent. The plant, which is operated 19 hours per day, was installed in 1890, and is valued at $362,463.

Municipal Distribution System—Supplied from the Niagara system of the Ontario Hydro-Electric Power Commission, the amount required being some 2,500 h.p. at $11.50 per h.p.-year at both 13,200 v. and 2,200 v. **Substation:** Three 850-k.w. station transformers step voltage down from 13,200 v. to 2,200 v. at 3 ph., 25 cy. Earnings divided, 84 per cent for lighting and 16 per cent for power. **Distribution:** 28 mi. of streets; primaries at

2,200 v. and secondaries at 110 v. and 220 v.; 178 line transformers, of 1,650 k.w. total capacity. Number of consumers, 2,530; connected load, 2,870 h.p. for lighting and 2,300 h.p. in motors. System valued at $182,052, of which $22,200 is for the substation. **Rates:** Domestic rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·15 cent to 4 cents per k.w.h.; power rate, from 0·18 cent to 2·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 50 per cent for power. Street lighting: enclosed arc, 100-w. and 32-c.p. lamps, at $50, $12 and $6, respectively, per lamp per year.

NIAGARA-ON-THE-LAKE, Lincoln Co. (1,858*). Supplied under municipal control, from the Niagara system (Ontario Power Company) of the Hydro-Electric Power Commission; amount taken, 170 h.p. at $15 per h.p.-year. **Substation:** Three 50-k.w. station transformers; output divided, 42 per cent for lighting and 58 per cent for power. **Distribution:** 18 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 22 line transformers, of from 1½ k.v.a. to 10 k.v.a. capacity. Number of consumers, 350. **Rates:** Meter lighting rate, from 2½ to 5 cents per k.w.h; power rate, from $18 to $21.85 per h.p.-year. Street lighting: 60-w. and 100-w. lamps, at $9 per lamp per year.

NIPISSING, Parry Sound Dist. Supplied under public control, 2½ k.w. being taken from the Nipissing system of the Hydro-Electric Power Commission; practically all used for lighting purposes. **Distribution:** 2½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 1 line transformer, of 2½ k.w. capacity. Number of consumers, 13; connected load, 2½ k.w. for lighting. **Rates:** Meter rate, 10 cents per k.w.h., less 20 per cent discount. Street lighting: 100-w. lamps, at $20 per lamp per year.

NORTH BAY, Nipissing Co. (9,197†). Supplied under public control, 900 h.p. being taken from the Nipissing system of the Hydro-Electric Power Commission. **Substation:** Three 450-k.v.a. station transformers step voltage down from 22,000 v. to 2,200 v. Load divided, 64 per cent for lighting and 36 per cent for power; load factor, 40 per cent. **Distribution:** 30 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 136 line transformers, of 1,092 k.w. total capacity. Number of consumers, 2,154; connected load, 700 k.w. for lighting and 1,106 h.p. in motors. **Rates:** Domestic lighting rate, from 1·75 to 3 cents per k.w.h., plus 3·5 cents per 100 sq. ft. of area per month; commercial, from 3 to 8 cents per k.w.h.; power rate, from 0·3 cent to 3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. and 750-c.p. lamps at $12 and $50.42 per lamp per year.

NORWICH, Oxford Co. (1,093*). Supplied under municipal control, 260 h.p. at $38 per h.p.-year, being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** Three 150-k.v.a. station transformers step voltage down from 13,200 v. to 2,200 v. at 3 ph., 25 cy. Earnings divided, 42 per cent for lighting, 24 per cent for power and 34 per cent for miscellaneous. Burgessville and Otterville are also supplied from this substation. **Distribution:** 5 mi. of streets, with 800 ft. underground; primaries at 2,200 v. and secondaries from 110 v. to 550 v.; 177 line transformers, of 504 k.w. total capacity, this including an important rural distribution. Number of consumers, 428; connected load, 71 k.w. for lighting and 225 h.p. in motors. Distribution system valued at $19,135. **Rates:** Domestic lighting rate, from 1½ to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·15 cent to 3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. and 100-w. tungsten and 400-w. nitro lamps, at $9, $10.50 and $42, respectively, per lamp per year.

NORWOOD, Peterborough Co. (659*). Supplied by W. C. Harrison from a steam plant. **Steam Plant:** Concrete building, 24 x 30 ft., containing an 80-h.p. boiler at 110 lbs. pressure, and a 75-h.p. engine, belted to a 30-k.w., single-ph., 133-cy., 1,000-v. generator.

Fuel: mill refuse and wood at $3 per cord; total yearly cost, $1,600. Plant gives night service only; installed in 1891 and valued at $8,000. **Distribution:** 3 mi. of streets; primaries at 1,000 v. and secondaries at 110 v.; ten line transformers, of 50 k.w. total capacity. Number of consumers, 110. Distribution system valued at $3,000. **Rates:** Flat rate, 91 cents to $4.20 per 25-w. lamp per year, according to uses. Street lighting: 40-w. lamps at $11.10 per lamp per year.

OAKVILLE, Halton Co. (2,749*). Supplied under municipal control, being obtained from the Dominion Power and Transmission Co. at 1 cent per k.w.h. **Substation:** Three 200-k.v.a. station transformers step voltage down from 40,000 v. to 2,200 v. at 3 ph., 66 cy. **Distribution:** 20 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 125 line transformers, of 1,050 k.w. total capacity. Number of consumers, 700; connected load, for power alone, 1,000 h.p. Distribution system valued at $45,000. **Rates:** Meter lighting rate, 10 cents per k.w.h. less 50 per cent discount; power rate, from 1·15 to 3 cents per k.w.h., according to amount. Street lighting: 60-c.p. and 1,000-c.p. nitro lamps, charged on meter basis.

OIL SPRINGS, Lambton Co. (537*). Supplied under municipal control, 75 h.p. at $38.54 per h.p.-year at 4,000 volts, being taken from the Niagara system of the Hydro-Electric Power Commission. **Substation:** One 75-k.w. station transformer steps voltage down from 26,400 v. to 4,000 v. at 3 ph., 25 cy. **Distribution:** 3 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 8 line transformers, of 75 k.w. total capacity. Number of consumers, 11; connected load, for power alone, 35 h.p. Distribution system valued at $7,500. **Rates:** Domestic meter rate, from 2½ to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; power rate, from 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional discounts up to 33⅓ per cent for restricted power. Street lighting: 100-w. lamps.

OMEMEE, Victoria Co. (446*). Supplied, under municipal control, from the Central Ontario system of the Hydro-Electric Power Commission, 50 h.p. being taken at $39.50 per h.p.-year. **Distribution:** 2½ mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 9 line transformers, of from 3 k.w. to 7 k.w. capacity. Number of consumers, 60; connected load, 40 k.w. for lighting, 37 h.p. in motors. System is valued at $9,000. **Rates:** Domestic, 2·5 to 5 cents per k.w.h. plus 3 cents per 100 sq. ft. area per month; power, 0·15 cent to 4·5 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 250-w. and 100-w. lamps.

ORANGEVILLE, Dufferin Co. (2,381*). Supplied under municipal control, 200 h.p. at $35 per h.p.-year at 4,000 volts being obtained from the Eugenia system of the Hydro-Electric Power Commission, while the Cataract Electric Co. also has a system supplied from its hydro-electric plant at Cataract; the latter company also supplies Erin, Alton and Melville from the same source, while it has an auxiliary steam plant in Orangeville.

Municipal System—Substation: Three 150-k.v.a. station transformers step voltage down from 22,000 v. to 4,000 v. at 3 ph., 60 cy. Earnings divided, 67 per cent for lighting, 30 per cent for power and 3 per cent for miscellaneous. The town of Alton is also supplied from this substation. **Distribution:** 23 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 28 line transformers, of from 2 k.w. to 25 k.w. capacity. Number of consumers, 190; connected load for power alone, 80 h.p. **Rates:** Domestic lighting rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 150-w. to 250-w. nitro lamps, at $12 to $15 per lamp per year.

Cataract Electric Co. System—Hydraulic Plant: The development at Cataract includes a concrete dam 72 ft. long and 20 ft. high, with two waste weirs. A 38-in. steel penstock, 320 ft. long, leads from the dam to a steel and concrete power house, 20 x 30 ft.; head, 75

ft. Installation: one 200-h.p. turbine, belted to a 150-k.w., 3-ph., 60-cy., 6,600-v. generator; and a 175-h.p. turbine direct connected to a 100-k.w., 3-ph., 60-cy., 2,200-v. generator; two 50-k.w. station transformers step voltage up from 2,200 v. to 6,600 v. Maximum load, 200 k.w.; load factor, 60 per cent. Plant gives continuous service. Load divided, 50 per cent for lighting and 50 per cent for power. Total cost of plant (including transmission lines and distribution systems), $50,000. Cost of energy (including distribution), $30 per h.p.-year. Plant began operation in 1896, a new dam having been completed in 1913. **Steam Plant:** Situated in Orangeville, and consists of a metal-covered frame building, containing a 100-h.p. return tubular boiler at 125 lbs. pressure, and a 150-h.p. Corliss engine, which is belted to a 150-k.w., 3-ph., 60-cy., 2,200-v. generator. Plant has practically never been used, as it was only installed as an auxiliary. **Transmission Lines:** There are two distinct transmission lines from Cataract, one to Erin 6 mi. long, and one to Orangeville, 8 mi. long, the latter being tapped at Melville and Alton, a 3-mi. tap extending to the latter place. Energy is transmitted at 6,600 v., 3 ph., 60 cy. The lines are single circuit Nos. 6 and 8 copper conductors, with pin-type insulators on wooden poles. Lightning protection, horn-gap arresters, choke coils and multiple gap arresters, while along the pole lines there are ground wires every one-half mile. **Substations:** There are two 50-k.w. step-down transformers at Orangeville, while in the other municipalities supplied the primary distribution is at 6,600 v. **Distribution:** The various systems of distribution, including Alton, Melville and Erin and also rural lines, cover a total of 15 mi. of streets or roads, the primaries being both at 6,600 v. and 2,200 v., and secondaries at 110 v. and 220 v., with 25 line transformers, of 170 k.w. total capacity. Number of consumers, 450; connected load, 225 k.w. **Rates:** Lighting meter rate, 5 to 9 cents per k.w.h., while the flat rate is 1 cent per day per lamp; meter power rate, 2 cents per k.w.h. Special flat rate for rural distribution, $12 to $30 per consumer per year. Street lighting: 60-w. lamps at from $10 to $12 per lamp per year.

ORILLIA, Simcoe Co. (7,448*). Supplied, under municipal control, from a hydro-electric plant on the Severn river, 20 miles distant, operated by the municipality. **Hydro-electric Plant:** The concrete dam forms a part of the Trent Canal system (Severn division). It is 75 ft. high and 230 ft. long, with five stoplog sluices, each 20 ft. wide. From the northern end of the dam, three concrete penstocks, 55 ft. long and 20 x 24 ft. section, lead to wheel-pits adjacent to the 119 x 27-ft. concrete power house, where a 47-ft. head is used. Three 2,120-h.p. turbines, each direct connected to a 1,500-k.v.a., 3-ph., 60-cy., 2,300-v. generator and three 3-ph., 1,500-k.v.a. station transformers step the voltage up from 2,300 v. to 23,000 v. for transmission to Orillia. Maximum load, 3,600 k.w. Plant gives continuous service, and was installed in 1917, at a cost of $114,000, exclusive of the building and development, which were constructed by the government. Since 1901, the municipality had a plant of 1,600 h.p. capacity, under a head of 41 ft., at Ragged rapids, which has now been replaced by the present plant. **Transmission Lines:** Two lines, each 20 mi. long, extend from the Swift Rapid plant to Orillia, operating at 23,000 v., 3 ph., 60 cy. Each line consists of one circuit designed to carry 2,000 h.p. and 1,500 h.p., respectively, with a loss of 10 to 15 per cent. Lightning protection, electrolytic arresters. **Substation** (at Orillia): Eight station transformers, four of 600 k.v.a. and four of 150 k.v.a., step voltage down from 23,000 v., 3 ph., to 2,300 v., 2 ph., 60 cy. Output divided, 29 per cent for lighting, 40 per cent for power and 31 per cent for electro-metallurgy; average load factor, 80 per cent. **Distribution:** 35 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 150 line transformers, of from 1 k.w. to 50 k.w. capacity. Number of consumers, 1,760; connected load, 1,400 k.w. for lighting and 2,990 h.p. in motors. **Rates:** Flat lighting rate, from 12 to 15 cents per 60-w. lamp per month, according to uses; meter rate, from 1 cent to 5 cents per k.w.h.; flat power rate, $15 to $20 per h.p.-year, according to restrictions. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps and 200-w. nitro lamps, at $6 and $12 per lamp per year.

ORONO, Durham Co. Supplied under public control, 25 h.p. being taken from the Newcastle substation of the Central Ontario system of the Hydro-Electric Power

Commission. Output divided, 87 per cent for lighting and 13 per cent for power. **Distribution:** 6 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 57 k.w. total capacity. Number of consumers, 128; connected load, 83 k.w. for lighting and 44 h.p. in motors. **Rates:** Domestic lighting rate, from 2·75 to 5·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·1 to 11 cents per k.w.h.; power rate, from 0·15 cent to 4·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. lamps, at $12 per lamp per year.

OSHAWA, Ontario Co. (8,812*). Supplied under public control, from the Central Ontario system of the Hydro-Electric Power Commission, 1,568 h.p. being taken. The system includes Courtice, while the Whitby system is also supplied from the Oshawa substation. **Substation:** Three 750-k.v.a. station transformers step voltage down from 44,000 v. to 4,000 v., 3 ph., 60 cy. Output divided, 43 per cent for lighting, 45 per cent for power, and 12 per cent for electric railway. **Distribution:** 50 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 127 line transformers, of 858 k.w. total capacity. Number of consumers, 1,550; connected load, 2,292 k.w. for lighting and 1,857 h.p. in motors. **Rates:** Domestic lighting rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·167 cent to 2·33 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent discount for power. Street lighting: 100-c.p. lamps, at $11 to $12 per lamp per year.

OTTAWA, Carleton Co. (101,549†). Electric energy is distributed both under municipal control and by the Ottawa Light, Heat and Power Co., the municipal system being supplied through the Ontario Hydro-Electric Power Commission by the Ottawa and Hull Power and Manufacturing Co., while the Ottawa Light, Heat and Power Co. has its own hydro-electric and auxiliary steam plants. **Development:** The hydro-electric plants above mentioned are situated at the Chaudière fall, on the Ottawa river, between Ottawa and Hull. The dam, which is also utilized by a number of other industries, is 22 ft. high, of concrete-pier, stop-log type, and 1,304 ft. long, in the form of an arc of a circle. Other important industries utilizing this site include both lumber and paper and pulp mills. The total amount of power utilized is approximately 60,000 h.p. By regulating the flow of the Ottawa river, the amount of power available here has lately been greatly increased, through the construction and operation of conservation dams by the Federal government at Kipawa, Quinze and Timiskaming. These three storage reservoirs have a total capacity sufficient to supply an additional flow of 10,000 cubic feet per second. This means that the possibilities at the Ottawa site alone have been increased by 30,000 h.p.

Ottawa and Hull Power and Manufacturing Co.—This company has one power house in operation, and another under construction. **No. 1 Hydro-electric Plant:** Water is led from the dam through a short concrete headrace to the 90 x 180-ft. power house, where a 32-ft. head is available. Equipment: five units, three of 2,200 h.p.-turbines, each direct connected to a 1,500-k.w., 2-ph., 60-cy., 2,200-v. generator, and two of 3,000-h.p. turbines, each direct connected to a 2,500-k.w., 3-ph., 60-cy., 11,000-v. generator. Six 1,000-k.w. station transformers step voltage up from 2,300 v., 2 ph., to 11,000 v., 3 ph., 60 cy. Maximum load, 12,000 h.p., of which a large portion is supplied to the Ottawa municipal electric system. Value of plant, $450,000, exclusive of water rights, which, for No. 1 plant alone, are estimated at $30,000. **No. 2 Hydro-electric Plant:** This plant is only under construction. The development will comprise a concrete headrace, 300 ft. wide and 430 ft. long, leading from the dam to the concrete power house, 200 x 200 ft., including the wheel pits. A head of 32 ft. will be utilized. The equipment will ultimately comprise four units of 6,750-k.v.a. generators, operating at 3 ph., 60 cy., 2,300 v., with station transformers in units of 6,750 k.v.a., stepping the voltage up from 2,300 v. to 12,000 v., 3 ph., 60 cy. Estimated cost for the complete installation of four units, $910,000, or slightly over $30 per

h.p.; this does not include the water rights, which, for this plant alone, are estimated at $60,000.

Municipal System- Energy is obtained through the Ontario Hydro-Electric Power Commission from the Ottawa and Hull Power Co. Amount taken, 6,390 h.p. at $14 per h.p.-year at 11,000 volts; transmitted from power plant to municipal substation at latter voltage through underground cables. **Substation:** Six 1,100-k.w. transformers step voltage down from 11,000 v. to 2,200 v. at 3 ph., 60 cy. Output divided, 34 per cent lighting and 66 per cent power; load factor, from 60 to 70 per cent, according to season. **Distribution:** Approximately 100 mi. of streets, with 8 mi. underground, including the 11,000-v. lines from plant to substation. Primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 900 line transformers, of 8,944 k.w. total capacity. Number of consumers, 10,125; connected load, 8,750 k.w. for lighting and 4,079 h.p. in motors. Value of system, $913,000, of which $109,000 is for substation. **Rates:** Domestic lighting rate, 0·5 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·5 cent to 5 cents per k.w.h.; power rate, 0·15 cent to 1·8 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional discounts up to 33⅓ per cent for restricted power. Street lighting: 600-c.p. and 400-c.p. nitro and 100-w. tungsten lamps at $45, $35 and $10 per lamp per year, respectively.

Ottawa Electric Co.—Energy obtained from two hydro-electric plants and a steam auxiliary plant. The company also distributes in suburbs, including from Eastview to Britannia and in Hull; and sells in block to Pointe Gatineau municipal system. **No. 1 Hydro-Electric Plant:** A forebay 900 ft. long leads to brick power house 250 x 50 ft. Head utilized, 28 ft. Equipment: four 1,100-h.p. turbines, each direct connected to a 700-k.v.a., 2-ph., 60-cy., 2,200-v. generator. Plant operated in conjunction with No. 2 plant. Installed 1900. Total maximum load on combined plants, 6,500 k.w., divided into 60 per cent lighting and 40 per cent power, with average yearly load factor of 52 per cent. **No. 2 Hydro-Electric Plant:** Natural forebay 1,100 ft. long leads to a stone power house, 200 x 50 ft. Head utilized, 33 ft. Equipment: three 1,800 h.p. turbines, each direct connected to a 1,300-k.v.a., 2-ph., 60-cy., 2,200-v. generator; six 1,500-k.v.a. station transformers, stepping voltage from 2,200 v. to 12,000 v. for transmission to substation. Installed in 1891, renewed since. Load adjusted between plants to suit conditions (see under No. 1 plant). **Steam Plant:** Brick building, 125 x 125 ft., with boiler room 75 x 110 ft. Equipment: four 500-h.p. and three 1,500-h.p. water tube boilers at 150 lbs. pressure, the latter three fitted with automatic stokers; one 1,500-k.w. and one 3,200-k.w. steam turbine units; generators at 2 ph., 60 cy., 2,200 v. Fuel: bituminous coal, at $8.40 per ton (1918); consumption varies, as plant is mainly used as auxiliary when short of water, and has not been extensively used during past two years. Installed 1908, replacing previous plant. **Transmission Line:** A portion of the energy is transmitted 1½ mi. at 12,000 v. from the power plants to the substation, situated in the central part of the city. **Substation:** Six 1,500-k.w. transformers, stepping voltage from 12,000 v. to 2,200 v. at 2 ph., 60 cy. **Distribution:** Including suburbs and Hull, 106 mi. of streets, with 1½ mi. underground; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 1,464 line transformers, of 17,973 k.w. total capacity. Number of consumers, 17,800. **Rates:** Domestic, 0·5 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, 0·5 cent to 5 cents per k.w.h. Power flat rate, $23 to $27 per h.p.-year, according to amount; power meter rate, 0·12 cent to 1·3 cents per k.w.h., plus monthly fixed charge of 80 cents per h.p. All rates subject to 10 per cent discount. Special rates for restricted power. Street lighting: outside of Ottawa, 100-w. tungsten lamps, at $13 per lamp per year.

OTTERVILLE, Oxford Co. Supplied under municipal control, from the Norwich substation of the Niagara system of the Hydro-Electric Power Commission, 32 h.p. being taken at $45 per h.p.-year, load practically all for lighting purposes. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 33 k.v.a. total capacity. Number of consumers, 70; connected load, 9 k.w. for lighting and 22 h.p.

in motors. Distribution system valued at $3,400. **Rates:** Domestic meter rate, from 2·75 to 5·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·1 to 11 cents per k.w.h.; power rate, from 0·15 cent to 4·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. nitro lamps, at $17 per lamp per year.

OWEN SOUND, Grey Co. (12,558). Supplied under municipal control, 900 h.p., at $31 per h.p.-year at 2,300 volts, being taken from the Eugenia system of the Hydro-Electric Power Commission. An emergency steam plant is connected with the system. **Steam Plant:** Brick building, 42 x 186 ft., containing five 125-h.p. return tubular boilers and two 500-h.p. compound condensing engines, direct connected, respectively, to a 450-k.w. and a 350-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: three-quarter lump coal, at $7 per ton. The steam plant, which is valued at $33,300, was installed in 1893, but at present is only used in emergencies. **Substation:** Three 500-k.w. station transformers step voltage down from 22,000 v. to 2,300 v. at 3 ph., 60 cy. Output divided, 83 per cent for lighting and 17 per cent for power. **Distribution:** 41 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 165 line transformers, of from 5 k.w. to 100 k.w. capacity. Number of consumers, 1,894; connected load, 1,284 k.w. for lighting, 1,518 k.w. in motors and 200 k.w. in appliances. Distribution system valued at $154,000, including $9,600 for the substation. **Rates:** Domestic meter rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 20 per cent discount with an additional discount of 10 per cent and upwards for restricted power. Street lighting: 60-w. and 400-c.p. lamps, at $11 and $50 per lamp per year.

PAISLEY, Bruce Co. (751*). Supplied by J. McNeil, from a hydro-electric plant on the north Saugeen river, 2½ miles east of the town. **Hydro-electric Plant:** Development: partly earth, partly crib work, and partly concrete dam, 300 ft. long and 12 ft. high, with an adjacent frame power house, 50 x 30 ft.; 12-ft. head available. Equipment: one 135-h.p. turbine, belted to a 75-k.w., 2-ph., 133-cy., 2,200-v. generator. Maximum load, 65 h.p. Slight trouble is sometimes experienced from shortage of water in the autumn and winter. The plant, which gives a night service only, was installed in 1895, and is valued at $12,000, including the distribution system. **Distribution:** 4½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 15 line transformers, of 60 k.w. total capacity. Number of consumers, 140; connected load, 56 k.w. for lighting. **Rates:** Flat rate, 30 cents per 16-c.p. lamp monthly; meter rate, 10 cents per k.w.h. Street lighting: 60-w. and 100-w. tungsten lamps, at $12 per lamp per year.

PAKENHAM, Lanark Co. Supplied by W. H. Edwards from a hydro-electric plant on the Mississippi river. **Hydro-electric Plant:** Wooden dam, 6 ft. high and 300 ft. long, with a wooden flume 12 x 12 ft. section and 100 ft. long, leading to a frame power house, 20 x 30 ft.; available head, 14 ft. Equipment: one 100-h.p. turbine, belted to a 50-k.w., 2-ph., 133-cy., 1,000-v. generator. Maximum load, 30 k.w. The plant, which gives a night service only, was first installed in 1897, but was rebuilt in 1915, and is valued at $2,000. **Distribution:** 3 mi. of streets; primaries at 1,000 v. and secondaries at 110 v.; 12 line transformers, of from 1½ k.w. to 5 k.w. capacity. Number of consumers, 70; connected load, 40 k.w. for lighting. **Rates:** Flat rate, $3.65 per 60-w. lamp per year. Street lighting: 50-c.p. lamps, at $7.30 per lamp per year.

PALMERSTON, Wellington Co. (1,843*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 150 h.p. at $40.82 per h.p.-year at 4,000 volts. **Substation:** Three 75-k.w. station transformers step voltage down from 26,400 v. to 4,000 v. at 3 ph., 25 cy. Earnings divided, 96 per cent for lighting and 4 per cent for power. **Distribution:** 8 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. to 550 v.; 17 line transformers, of 140 k.w. total capacity. Number of

consumers, 260; connected load, 230 h.p. for lighting and 70 h.p. in motors. Value of distribution system, $8,000. **Rates:** Domestic meter rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 4·7 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. nitro lamps at $15 per lamp per year.

PARIS, Brant Co. (4,447*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 450 h.p. at $21 per h.p.-year at 26,400 volts. **Substation:** Three 200-k.w. station transformers step voltage down from 26,400 v. to 2,200 v. at 3 ph., 25 cy. Load divided, 68 per cent for lighting and 32 per cent for power; load factor, 70 per cent. **Distribution:** 16·5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 55 line transformers of from 3 k.w. to 15 k.w. capacity. Number of consumers, 650; connected load, 750 h.p. for lighting and 1,575 h.p. in motors. Distribution system valued at $31,760. **Rates:** Meter lighting rate, from 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·7 cent to 7 cents per k.w.h.; power rate, from 0·15 cent to 2·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. lamps, at $11 per lamp per year.

PARKHILL, Middlesex Co. (1,263*). Supplied by H. C. Baird, Son & Co., from a steam-power plant operated in connection with their factory. **Power Plant:** Brick building 30 x 30 ft., with a boiler room extension 14 x 36 ft., containing one 110-h.p. return tubular boiler at 100 lbs. pressure, and a 100-h.p. engine, belted through a countershaft to two 22-k.w., 220-v., d.c. generators and to a 28-light arc generator. Maximum load, 32 k.w. Fuel: coal; annual consumption, 350 tons, at $8. The plant, which gives a night service only, was installed in 1892. **Distribution:** 3 mi. of streets; distribution effected at 3 wires, d.c., supplying connected load of 650 k.w. **Rates:** Meter rate, 9 cents per k.w.h. Street lighting: enclosed arc lamps, at $100 per lamp per year.

PARRY SOUND, Parry Sound Dist. (5,526*). Supplied, under municipal control, from a hydro-electric plant on the Seguin river within the town. The system also supplies Rose Point. **Hydro-Electric Plant:** Concrete dam, 150 ft. long and 15 ft. high, extending into a forebay, which is 60 ft. wide and 100 ft. long, whence the water is led through an open wooden flume, 12 ft. wide and 120 ft. long, and an 11-ft. steel penstock 5 ft. long, to a brick power house, 30 x 40 ft.; available head, 20 ft. Equipment: one 600-h.p. turbine, direct connected to a 425-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 460 k.w. Extensive use is made of conservation storage in the upper waters; it is proposed to extend this further, the upper waters affording splendid opportunities. The stored water is generally used in the autumn and winter, particularly during October and March. The plant, which gives a continuous service, was installed in 1906 and is valued at $67,000, including the distribution system. A small plant had been in operation previously. **Distribution:** Including Rose Point, 15 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 550 v.; 95 line transformers, of 950 k.w. total capacity. Number of consumers, 900; connected load, 450 k.w. for lighting, 290 h.p. in motors and 225 k.w. in appliances. **Rates:** Meter lighting rate, 4 cents per k.w.h., with a minimum charge and meter rental; power rate, from 1·2 to 3 cents per k.w.h., according to capacity, with a minimum charge. Street lighting: 100-c.p. and 150-c.p. tungsten and nitro lamps, charged on meter basis of 2½ cents per k.w.h.

PEMBROKE, Renfrew Co. (7,846*). Supplied by Pembroke Electric Light Co., from a hydro-electric plant on the Black river, 14 miles distant; there is also a steam auxiliary plant in the town. **Hydro-Electric Plant:** Concrete dam, 45 ft. long and 30 ft. high, from which a 7-ft. iron penstock, 900 ft. long, leads to a concrete power house 58 x 50 ft.; available head, 130 ft. Equipment: two 900-h.p. and one 1,800-h.p. turbines, direct

connected, respectively, to two 500-k.w. and one 1,250-k.w., 3-ph., 60-cy., 2,500-v. generator. Energy is stepped up through three 750-k.w. station transformers to 25,000 v. for transmission. Maximum demand, 1,400 k.w.; load factor, about 75 per cent. Plant valued at $240,000, including the steam auxiliary plant; continuous service provided. **Steam Auxiliary Plant:** Three 150-h.p. return tubular boilers and a 350-h.p. Corliss engine, direct connected to a 225-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal, plant only used in emergencies. **Transmission Line:** The transmission line from the hydro-electric plant, 14 mi., operates at 25,000 v., 3 ph., 60 cy., and consists of a single circuit of three No. 4 copper wires supported by pin-type insulators on cedar poles; value, $20,000. Lightning protection, electrolytic arresters. **Substation:** Equipment, installed in the auxiliary steam plant building, comprises six 330-k.w. station transformers, stepping voltage down from 25,000 v. to 2,250 v., at 3 ph., 60 cy. **Distribution:** 25 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 81 line transformers, of from 1 k.w. to 15 k.w. capacity. Number of consumers, 1,000; connected load, 1,600 k.w. for lighting and 1,500 k.w. for power. **Rates:** Domestic lighting rate, 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, 8 cents per k.w.h.; appliances, 1½ cents per k.w.h. All above rates subject to 10 per cent discount, with an additional 5 per cent for large consumers. Average power rate, $18 per h.p.-year. Street lighting: enclosed arc lamps, at $45 per lamp per year.

PENETANGUISHENE, Simcoe Co. (3,672*). Supplied, under municipal control, from the Severn system of the Hydro-Electric Power Commission. Amount taken, 400 h.p. at $22 per h.p.-year at 2,200 volts. **Substation:** Three 200-k.v.a. transformers step voltage down from 22,000 v. to 2,200 v., 3 ph., 60 cy. Output divided, 31 per cent lighting and 69 per cent power. Load factor, 85 per cent. **Distribution:** 14 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 50 line transformers, of 1,599 k.w. total capacity. Number of consumers, 305; connected load, 234 k.w. for lighting alone. Value of system, $46,392, of which $3,508 is for substation. **Rates:** Domestic, 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·6 cent to 6 cents per k.w.h.; power rate, 0·12 cent to 1·5 cents per k.w.h., plus a monthly fixed charge of 90 cents per h.p. All rates subject to 10 per cent discount and up to 33⅓ per cent for restricted power. Street lighting: 100-w. lamps at $12 per lamp per year.

PERTH, Lanark Co. (3,358*). Supplied under municipal control from three hydro-electric plants with a steam auxiliary plant; one of the hydro-electric plants is exclusively for street lighting. **Glen Tay Hydro-electric Plant:** Situated on the Tay river, 3 mi. from town. Development: rock-filled crib dam, 75 ft. long and 10 ft. high, with an open wooden flume, 14 x 14 ft. section and 50 ft. long, leading to a stone power house 45 x 45 ft.; available head, 10 ft. Equipment: one 175-h.p. turbine, belted to a 150-k.w., 2-ph., 133-cy., 2,200-v. generator. Maximum load on Glen Tay and Badour, 250 h.p., load on each adjusted to suit conditions, and may be divided, 75 per cent for lighting and 25 per cent for power. Trouble sometimes experienced from low water, but a continuous service is supplied. Plant installed in 1899. Glen Tay, Badour and steam plant with distribution system exclusive of street lighting valued at $75,000. **Badour Plant:** This plant is also located on the Tay river, one mile above Glen Tay. Development: rock-filled crib dam, 65 ft. long and 16 ft. high, with an open wooden flume of 12 x 17 ft. section and 20 ft. long, leading to a stone power house 38 x 40 ft.; available head, 16 ft. Equipment: one 250-h.p. turbine, belted to a 216-k.w., 2-ph., 133-cy., 2,200-v. generator. Slight trouble sometimes experienced from low water. This plant installed in 1897, but rebuilt in 1910. **Hydro-electric Plant for Street Lighting:** Situated on the Tay river, 9 miles above the town. Development: Wooden dam, 150 ft. long and 11 ft. high, with an adjacent frame power house, 15 x 22 ft.; available head, 12 ft. Equipment: one 125-h.p. turbine, belted through a countershaft to two 35-light, d.c. arc generators. Maximum load, 20 k.w. Slight trouble sometimes experienced from low water. The plant, which was installed in 1904, is valued at $14,000, including the street lighting distribution. **Steam Plant:** Brick building 40 x 60 ft.,

being also used for water-works purposes. Equipment: one 250-h.p. fire-tube boiler at 100 lbs. pressure, this being also used in connection with the water-works. The generating unit consists of a 250-h.p. compound engine, belted to a 150-k.w., 2-ph., 133-cy., 2,200-v. generator. Fuel: bituminous lump coal; plant only used as an auxiliary and for water-works purposes; installed in 1914. **Distribution:** 15 mi. of streets, including supply lines from the power plants; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 75 line transformers, of 300 k.w. total capacity. Number of consumers, 500; connected load, 500 k.w. for lighting, 250 h.p. in motors, and 200 k.w. in appliances. **Rates:** For lighting, from 6 to 8 cents per k.w.h.; for power, from 1½ to 3 cents per k.w.h., all rates being based on consumption. Street lighting: enclosed arc lamps at $65 per lamp per year.

PETERBOROUGH, Peterborough Co. (20,598†). Supplied under municipal control, being obtained from the Central Ontario system of the Hydro-Electric Power Commission. The Peterborough Hydraulic Co. also has a hydro-electric plant here, a portion of whose output is supplied to the Hydro-Electric Power Commission, while the remainder is supplied in bulk to a large cereal mill.

Municipal System—Energy obtained, 4,500 h.p., at $17.50 per h.p.-year, at 6,600 v. and 2,400 v. **Substation:** Six 250-k.w. and two 750-k.w. station transformers step voltage down from 6,600 v. to 2,400 v., 3 ph., 60 cy.; output divided, 11 per cent for lighting and 89 per cent for power; average load factor, 60 per cent. **Distribution:** 90 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 525 line transformers, of from 2 k.w. to 75 k.w. capacity. Number of consumers, 4,956. Distribution system valued at $252,716, including $16,171 for the substation. **Rates:** Domestic rate, from 1·25 to 2·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·5 cent to 5 cents per k.w.h.; power rate, from 0·1 cent to 1·3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional discount of 10 per cent for power. Street lighting: magnetite lamps and 60-w. tungsten lamps, at $50.50 and $9 per lamp per year, respectively.

Peterborough Hydraulic Co.—Power Plant: Concrete dam 325 ft. long and 20 ft. high, with an adjacent concrete and brick power house 40 x 110 ft.; normal head of 27 ft. afforded. **Equipment:** One 1,600-h.p. and one 2,000-h.p. turbine, direct connected, respectively, to a 750-k.w. and a 1,500-k.w., 3-ph., 60-cy., 2,400-v. generator. Plant designed for an ultimate capacity of 4,000 k.w. to 4,500 k.w.; present maximum demand, 2,500 k.w. Slight trouble sometimes experienced from anchor ice. While there is sufficient flow for the present output, the latter, it is stated, would be greatly increased by the use of conservation storage above the dam. The plant, which is valued at $500,000, was installed in 1902 and gives a continuous service.

PETERSBURG, Waterloo Co. Supplied from the Baden system. See under Baden.

PETROLIA, Lambton Co. (3,047*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 240 h.p., at $36.26 per h.p.-year at 4,000 volts. **Substation:** Three 150-k.v.a. station transformers step voltage down from 26,400 v. to 4,000 v., at 3 ph., 25 cy. Load divided, 43 per cent for lighting and 57 per cent for power; load factor, 85 per cent. **Distribution:** 30 mi. of streets with one mile underground; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 58 line transformers of from 3 k.w. to 15 k.w. capacity. Number of consumers, 388; connected load, 510 h.p. for lighting and 295 h.p. in motors. Distribution system valued at $50,000. **Rates:** Domestic meter rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h. plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 150-c.p. and 600-c.p. lamps, at $15.50 and $55 per lamp per year.

PICTON, Prince Edward Co. (3,408*). Supplied, under municipal control, from a steam-power plant. **Steam Plant:** Brick building, 40 x 80 ft., contains four 90-h.p. return tubular boilers, at 85 lbs. pressure, and two 150-h.p. and a 75-h.p. condensing engine, the former two being belted to a 175-k.w. generator and the other direct connected to a 60-k.w. generator; energy generated at 2 ph., 60 cy., 2,200 v. Maximum load, 161 k.w., divided, 89 per cent for lighting and 11 per cent for power. Fuel: three-quarter lump coal; yearly consumption, 1,800 tons, at $11.50 per ton. Plant gives continuous service, was installed in 1889, and is valued at $25,000. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 20 line transformers, of 127 k.w. total capacity. Number of consumers, 720. Distribution system valued at $10,000. **Rates:** Lighting rate, 10 cents per k.w.h.; power and heating, 6 cents per k.w.h. Street lighting: 100-c.p. nitro lamps, charged at the meter rate of 6 cents per k.w.h.

PLATTSVILLE, Oxford Co. (398†). Supplied under municipal control from the Drumbo substation of the Niagara system of the Hydro-Electric Power Commission; amount taken, 60 h.p. at $49.27 per h.p.-year at 4,000 volts. Earnings divided, 55 per cent for lighting and 45 per cent for power. **Distribution:** $1\frac{7}{8}$ mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; three line transformers. Number of consumers, 85; connected load, 71 h.p. for lighting and 70 h.p. in motors. Distribution system valued at $5,283. **Rates:** Domestic meter rate, 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·2 to 12 cents per k.w.h.; power rate, from 0·15 cent to 5·4 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps at $16.50 per lamp per year.

PT. EDWARD, Lambton Co. (937*). Supplied from the Sarnia distribution system. See under Sarnia.

PORT ARTHUR, Thunder Bay Dist. (15,224*). Supplied under municipal control, being obtained from two sources, one of which is through the Hydro-Electric Power Commission from the Kaministikwia Power Co. (see under Fort William), at $16 per h.p.-year, while the other is from the municipal hydro-electric plant on the Current river in the city. **Hydro-Electric Plant:** The development on Current river includes a concrete dam, 20 ft. high and some 500 ft. long, whence two wood-stave pipes, each 2,000 ft. long and, respectively, 5 ft. and 6 ft. diam., lead to a concrete and stone power house, 65 x 50 ft.; available head, 85 ft. Equipment: three main units, two of which comprise 450-h.p. turbines, each direct connected to a 250-k.w. generator, while the third is a 1,000-h.p. turbine, direct connected to a 660-k.w. generator; all energy generated at 2,200 v., 3 ph., 60 cy. Maximum load, 3,090 h.p. Plant at present used only during peak load as an auxiliary to the purchased power. It was installed in 1901, and valued at $347,500. There is a large conservation dam in connection with this plant at Onion lake, the dam being of rock-filled crib-work and 56 ft. high. **Substation:** The substation, which is used for the energy received from the Kaministikwia Power Co., comprises six 750-k.v.a. station transformers, stepping voltage down from 22,000 v. to 2,200 v., at 3 ph., 60 cy.; motor generator sets also supply 550 v. d.c. energy for electric railway purposes. Total power purchased, 2,600 h.p., at $16 per h.p.-year, but with the energy from the municipal hydro-electric plant, the maximum load is approximately 5,500 h.p., which may be divided, 33 per cent for lighting, 50 per cent for power and 17 per cent for electric railway. Cost of energy from the combined sources, $23 per h.p.-year. **Distribution:** 35 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; line transformers of from 1 k.w. to 40 k.w. capacity. Number of consumers, 3,182. **Rates:** Domestic meter rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·5 cent to 5 cents per k.w.h.; power rate, from 0·15 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. and 60-w. tungsten lamps, at approximately 7.10 per 100-w. lamp per year.

PORT CARLING, Muskoka Dist. (256*). Supplied by W. Hanna, from a gasolene-engine plant. **Power Plant:** One 10-h.p. gasolene engine, operating a 25-k.w., 110-v., d.c. generator. **Distribution:** Confined to 8 consumers in the neighbourhood. Street lighting: 60-w. lamps.

PORT COLBORNE, Welland Co. (2,655*). Supplied from the Humberstone system. See under Humberstone.

PORT CREDIT, Peel Co. (1,176*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 63 h.p. at $27 per h.p.-year at 2,200 volts. **Substation:** Three 75-k.w. station transformers step voltage down from 13,200 v. to 2,200 v., at 3 ph., 25 cy. Earnings divided, 93 per cent for lighting and 7 per cent for power. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 13 line transformers of 80 k.v.a. total capacity. Number of consumers, 180; connected load, 193 h.p. for lighting and 18 h.p. in motors. Distribution system valued at $12,604. **Rates:** Domestic meter rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·15 cent to 2·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $11 per lamp per year.

PORT DALHOUSIE, Lincoln Co. (1,318*). Supplied, under municipal control, from the St. Catharines substation of the Niagara system of the Hydro-Electric Power Commission; amount taken, 82 h.p., at approximately $24 per h.p.-year. Earnings divided, 93 per cent for lighting and 7 per cent for power. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 34 line transformers of 195 k.w. total capacity. Number of consumers, 370; connected load, 410 h.p. for lighting and 25 h.p. in motors. Distribution system valued at $17,536. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 2·3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount with an additional 10 per cent discount for power. Street lighting: 100-w. lamps, at $10 per lamp per year.

PORT ELGIN, Bruce Co. (1,321*). Supplied by Saugeen Electric Light and Power Co. (See Southampton). **Distribution:** 7½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; energy at 440 v. supplied directly from substation for power. Number of consumers, 236; connected load, 66 k.w. Value, $10,500. **Rates:** Domestic, from 2½ to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates subject to 10 per cent discount. Street lighting: 60-w. and 100-w. tungsten lamps, at $14 per lamp per year.

PORT HOPE, Durham Co. (4,486*). Supplied, under public control, from the Central Ontario system of the Hydro-Electric Power Commission; amount taken, 535 h.p. **Substation:** One 750-k.v.a. and one 300-k.v.a. station transformers step voltage down from 44,000 v. to 2,400 v., 3 ph., 60 cy.; output divided, 60 per cent for lighting and 40 per cent for power. **Distribution:** 25 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 115 line transformers of 754 k.w. total capacity. Number of consumers, 873; connected load, 1,749 k.w. for lighting and 618 h.p. in motors. **Rates:** Domestic lighting rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·167 cent to 2·33 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount with an additional 10 per cent discount for power. Street lighting: 100-c.p. lamps, at $11 per lamp per year.

PORT McNICOLL, Simcoe Co. (571†). Supplied, under municipal control, from the Severn system of the Hydro-Electric Power Commission, the Canadian Pacific Ry. elevator being also supplied from this system.

ONTARIO HYDRO-ELECTRIC POWER COMMISSION—PORTION OF LAMP LABORATORY, TORONTO, ONT., SHOWING LARGE PHOTOMETER ON RIGHT.

ONTARIO HYDRO-ELECTRIC POWER COMMISSION—HYDRO-ELECTRIC PLANT, EUGENIA FALLS, GREY CO., ONT., SUPPLYING EUGENIA SYSTEM.

Head utilized, 540 ft., highest in Ontario.

Municipal System—Amount of power taken, 20 h.p. at $25 per h.p.-year at 2,200 volts. **Substation:** Two 25-k.v.a. station transformers step voltage down from 22,000 v. to 2,200 v. at 3 ph., 60 cy.; output practically all for lighting. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 45 k.w. total capacity. Number of consumers, 88; connected load, 50 k.w. for lighting and 6 h.p. in motors. Distribution system valued at $4,982. **Rates:** Domestic meter rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

Canadian Pacific Ry. Elevator—Amount of power taken, approximately 1,000 h.p. Substation equipment: three 500-k.v.a. station transformers, stepping voltage down from 22,000 v. to 575 v., at 3 ph., 60 cy.

PORT PERRY, Ontario Co. (1,004*). Supplied, under municipal control, from a steam-power plant. **Steam Plant:** Brick building, 40 x 40 ft.; contains one 90-h.p. boiler and a 75-h.p. engine, belted to a 60-k.w., single-ph., 133-cy., 1,100-v. generator. Maximum load, 25 k.w. Fuel: coal; yearly consumption, 275 tons, at $5 per ton. Plant, which gives a night service only, was installed in 1902, and is valued at $24,000, including distribution system. **Distribution:** 15 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 17 line transformers, of from 1 k.w. to 6 k.w. capacity. Number of consumers, 210. **Rates:** Meter rate, from 10 to 12½ cents per k.w.h. Street lighting: 25-c.p. to 60-c.p. lamps, at an average of $4.20 per lamp per year.

PORT ROBINSON, Welland Co. Supplied, under municipal control, from the Niagara system of Hydro-Electric Power Commission (Ontario Power Co.); amount taken, 500 h.p., of which a large portion is for special industrial purposes, at $14 per h.p.-year at 12,000 volts. **Substation:** Three 75-k.v.a. and three 150-k.v.a. transformers step voltage from 12,000 v. to 2,200 v., at 3 ph., 25 cy. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 4 line transformers, of 80 k.v.a. total capacity. Number of consumers, 75; connected load, 50 k.w. for lighting and 50 k.w. in motors and appliances, exclusive of special industrial purposes. Value of distribution system, $3,500. **Rates:** Domestic, 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·6 cent to 6 cents per k.w.h.; power rate, 0·15 cent to 1·8 cents per k.wh., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount.

PORTSMOUTH, Frontenac Co. (687*). Supplied from the Kingston system. See under Kingston.

PORT STANLEY, Elgin Co. (831*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 200 h.p. at approximately $50 per h.p.-year at 2.200 volts. **Substation:** Three 50-k.w. station transformers step voltage down from 13,200 v. to 2,200 v., at 3 ph., 25 cy. Earnings divided, 73 per cent for lighting, 24 per cent for power and 3 per cent for miscellaneous. **Distribution:** 8 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 22 line transformers, of 225 k.v.a. total capacity. Number of consumers, 391; connected load, 404 h.p. in lighting and 70 h.p. in motors. Distribution system valued at $21,534. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 5 cents per k.w.h. plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at from $6.50 to $13 per lamp per year.

POWASSAN, Parry Sound Dist. (572*). Supplied, under public control, from the Nipissing system of the Hydro-Electric Power Commission; amount taken, 40 h.p. **Substation:** Three 50-k.v.a. station transformers step voltage down from 22,000 v. to 2,200

v., at 3 ph., 60 cy. Average load factor, estimated at 40 per cent. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 16 line transformers, of 96 k.w. total capacity. Number of consumers, 102; connected load, 35 k.w. for lighting and 70 h.p. in motors. **Rates:** Meter lighting rate, 10 cents per k.w.h., less 20 per cent discount; power rate, from 0·3 cent to 3·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p., less 10 per cent discount. Street lighting: 60-w., 100-w. and 150-w. lamps, at $13, $20 and $25 per lamp per year.

PRESCOTT, Grenville Co. (2,630*). Supplied, under municipal control, from the St. Lawrence system of the Hydro-Electric Power Commission; the amount of power taken is 240 h.p. at $25 per h.p.-year at 2,200 volts. The municipality also has an auxiliary steam plant used in emergencies. **Auxiliary Steam Plant:** Two 150-h.p. boilers and two engines of 150 h.p. and 75 h.p. capacity, respectively, both operating the same 150-k.w., 3-ph. generator. The plant is only used in cases of emergency, and is valued at $12,108. **Substation:** Three 150-k.v.a. station transformers step voltage down from 26,400 v. to 2,200 v., at 3 ph., 60 cy. Output divided, 35 per cent for lighting and 65 per cent for power. **Distribution:** 12 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 80 line transformers of from 2 k.w. to 30 k.w. capacity. Number of consumers, 450. Distribution system valued at $32,318. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·2 cent to 2·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $6.25 per lamp per year.

PRESTON, Waterloo Co. (4,949*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 1,400 h.p., at $19 per h.p.-year at 6,600 volts. **Substation:** Six 175-k.v.a. station transformers step voltage down from 6,600 v. to 2,200 v. at 3 ph., 25 cy. Output divided, 16 per cent for lighting and 84 per cent for power. **Distribution:** 23¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 79 line transformers, of 1,280 k.w. total capacity. Number of consumers, 1,025; connected load, 1,245 h.p. for lighting and 1,571 h.p. in motors. Value of distribution system, $111,640. **Rates:** Domestic meter rate, from 1·25 to 2·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·5 cent to 5 cents per k.w.h.; power rate, from 0·133 cent to 1·67 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional discounts up to 33⅓ per cent for power, according to restrictions. Street lighting: 80-c.p. and 150-c.p. nitro lamps, at $11 and $12 per lamp per year.

PRINCETON, Oxford Co. (239†). Supplied from Drumbo substation of the Niagara system of the Hydro-Electric Power Commission; amount taken, 10 h.p., at $65.95 per h.p.-year at 4,000 volts. Earnings divided, 83 per cent for lighting and 17 per cent for power. **Distribution:** 1½ mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; line transformers of from 3 k.w. to 15 k.w. capacity, of a total value of $681. Number of consumers, 55; connected load, 35 h.p. for lighting. Value of system, $3,219. **Rates:** Domestic, 3·5 to 7 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1·4 to 14 cents per k.w.h. Power, 0·15 cent to 7·8 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $17 per lamp per year.

RAINY RIVER, Rainy River Dist. (1,502*). Supplied by the Rainy River Electric Light and Power Co. from a steam-power plant. **Steam Plant:** Concrete building, 33 x 65 ft., containing two 150-h.p. return tubular boilers, at 130 lbs. pressure, and two 125-h.p. engines, each belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: both wood and coal; yearly consumption, 600 cords of wood, at $3.50 a cord, and 200 tons of coal, at $6.13 per ton. Plant gives night service only; value, $20,000; installed 1908. **Distribution:** 4½ mi. of

streets; primaries at 2,200 v. and secondaries at 110 v.; 15 line transformers of from 3½ k.w. to 7 k.w. capacity. Number of consumers, 240; connected load, 100 k.w., all for lighting. Distribution system valued at $4,500. **Rates:** Meter rate, 11 cents per k.w.h. net. Street lighting: 100-w. lamps, at $15 per lamp per year.

RENFREW, Renfrew Co. (6,611†). Supplied, under municipal control, from two hydro-electric plants, one being combined with a steam auxiliary. **No. 1 Hydro-electric Plant:** Combined steam auxiliary. Situated on the Bonnechère river, within the town. It comprises a concrete-pier and stop-log type dam, 20 ft. high and 165 ft. long, including wings. A concrete retaining wall forms an open flume 440 ft. long leading to the concrete power house, 113 x 85 ft., where a head of 38 ft. is afforded. Equipment: two 400-h.p. turbines, each direct connected to a 250-k.v.a., 2-ph., 60-cy., 2,300-v. generator. Steam equipment: three return tubular boilers, two are of 75 h.p. and one of 150 h.p., with a 300-h.p. compound engine, belted to a 200-k.v.a., 2-ph., 60-cy., 2,200-v. generator. Two 550-k.v.a. station transformers step voltage up from 2,200 v. to 6,600 v. for emergency supply to Calabogie Light and Power Co.'s system. Maximum load, 950 h.p.; average yearly load factor 80 per cent. Slight trouble has been experienced from shortage of water, but this is being gradually corrected by storage, there being at present two reservoirs in use, having a total capacity of nearly 100,000 acre-feet. Plant gives a continuous service, was installed in 1912, and is valued at $185,000, including the power site, hydro-electric and steam plants, and water-works equipment. **No. 2 Hydro-electric Plant:** Situated on the Bonnechère river, within the town limits, 400 ft. below No. 1 plant. Development includes a timber and concrete dam, 200 ft. long and 25 ft. high, whence two 6½-ft. wood-stave pipes, 600 ft. long, with two 8-ft. steel standpipes, lead to a brick power house, 38 x 60 ft., where a head of 35 ft. is available. Equipment: one 400-h.p. and one 600-h.p. turbine, direct connected, respectively, to a 300-k.w. and a 400-k.w., 2-ph., 60-cy., 2,300-v. generator. Maximum demand, 850 h.p. Average load factor, 80 per cent. Plant is also benefited by the conservation storage referred to under No. 1 plant. The plant is valued at $100,000, was installed in 1902, and gives continuous service. **Distribution:** 21 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 119 line transformers, ranging from 2 k.w. to 75 k.w. Number of consumers, 832; connected load, 350 h.p. for lighting and 1,450 h.p. in motors. Distribution system valued at $38,000. **Rates:** Meter rate, 4½ to 7½ cents per k.w.h.; power rate, $20 per h.p.-year. Street lighting: 150-c.p. and 750-c.p. nitro lamps, at $20 per h.p.-year, plus maintenance.

RICHMOND HILL, York Co. (920*). Supplied under municipal control, being obtained from the Toronto and York Radial Ry. Co. at 1·35 cents per k.w.h. at 2,200 volts. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 25 line transformers of 165 k.w. total capacity. Number of consumers, 165; connected load, 75 k.w. for lighting and 66 h.p. in motors. Distribution system is valued at $12,000. **Rates:** Meter rate for lighting and appliances, from 1·8 to 4·8 cents net per k.w.h., with a minimum monthly charge; power rate, from 0·5 cent to 1·8 cents per k.w.h., with a service charge of from 50 cents to $1 per h.p. per month, according to capacity. Street lighting: 100-w. and 150-w. lamps at $13 per lamp per year.

RIDGETOWN, Kent Co. (2,080*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 85 h.p., at $47.17 per h.p.-year, at 4,000 volts. **Substation:** Three 75-k.w. station transformers step voltage down from 26,400 v. to 4,000 v. at 3 ph., 25 cy. **Distribution:** 11 mi. of streets; primaries at 2,200 v. and 4,000 v. and secondaries at 110 v. to 550 v.; 13 line transformers, of from 3 k.w. to 15 k.w. capacity. Number of consumers, 296; connected load, 332 h.p. for lighting and 105 h.p. in motors. Distribution system valued at $13,581. **Rates:** Domestic meter rate, from 2·75 to 5·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·1 to 11 cents per k.w.h.; power rate, from 0·15 cent to 4·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. and 400-w. lamps, at $18 and $37 per lamp per year.

RIDGEVILLE, Welland Co. Supplied by Welland Electric Co. See under Welland.

RIDGEWAY, Welland Co. (600†). Supplied from the Fort Erie system. See under Fort Erie.

ROCKLAND, Russell Co. (3,264*). Supplied by W. C. Edwards & Co. from a steam plant. **Steam Plant:** Brick building 29 x 24 ft., containing two 150-h.p. return tubular boilers, at 90 lbs. pressure, and a 75-h.p. engine, belted to a 50-k.w., 1,000-v., a.c. generator. Fuel: wood; daily consumption, 7 cords, at $2 per cord. Plant gives a night service only, was installed in 1892, and is valued at $7,000, including the system of distribution. **Distribution:** 3½ mi. of streets; primaries at 1,000 v. and secondaries at 104 v.; 35 line transformers, of 50 k.w. total capacity. Number of consumers, 77. **Rates:** There are no rates in force.

ROCKWOOD, Wellington Co. Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 20 h.p., at $38 per h.p.-year at 2,300 v. **Substation:** Three 25-k.w. station transformers step voltage down from 13,200 v. to 2,300 v. at 3 ph., 25 cy. Earnings divided, 64 per cent for lighting and 36 per cent for power. **Distribution:** 3 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 10 line transformers of 80 k.w. total capacity. Number of consumers, 87; connected load, 86 h.p. for lighting and 67 h.p. in motors. Value of distribution system, $6,986. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month, commercial, from 0·8 cent to 8 cents per k.w.h. Power rate, from 0·15 cent to 3·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. and 100-w. lamps, at $11 per lamp per year.

RODNEY, Elgin Co. (626*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 50 h.p. at $63 per h.p.-year at 4,000 volts, from the West Lorne substation. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and 4,000 v., and secondaries at 110 v. and 220 v.; 8 line transformers, of 45 k.w. total capacity. Number of consumers, 85; connected load, 100 h.p. for lighting and 15 h.p. in motors. Value of distribution system, $8,500. **Rates:** Domestic meter rate, 8 cents per k.w.h.; commercial, 16 cents per k.w.h. Street lighting: 100-w. lamps, at $16.50 per lamp per year.

ROSE POINT, Parry Sound Dist. Supplied from the Parry Sound system. See under Parry Sound.

ST. AGATHA, Waterloo Co. (150†). Supplied from the Baden system. See under Baden.

ST. CATHARINES, Lincoln Co. (19,078†). Supplied from two sources, one under municipal control and the other, the Dominion Power and Transmission Co.

Municipal System—Supplied from Niagara system of Hydro-Electric Power Commission; amount taken, 4,700 h.p. at $14 per h.p.-year at 12,000 v,, 3 ph., 25 cy. Earnings divided, 39 per cent for lighting and 61 per cent for power. **Distribution:** 50 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 264 line transformers, of 7 000 k.w. total capacity. Number of consumers, 3,155; connected load, 3,600 h.p. for lighting and 7,638 h.p. in motors. Value of system, $289,172, of which $44,284 is for substation. **Rates:** Domestic, 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·15 cent to 4 cents per k.w.h.; power, 0·12 cent to 1·2 cents per k.w.h., plus monthly fixed charge of 75 cents per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $7.50 per lamp per year.

Dominion Power and Transmission Co. System—The energy for this system is supplied from the company's Power Glen hydro-electric and Hamilton steam plants. See under

Hamilton. **Distribution:** 25 mi. of streets: primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 200 line transformers, of from 1 k.w. to 150 k.w. capacity.

ST. EUGENE, Prescott Co. (524†). Supplied by the North River Electric Co. See under St. Andrews, Que.

ST. GEORGE, Brant Co. Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 50 h.p., at $38.78 per h.p.-year at 4,000 volts. Earnings divided, 75 per cent for lighting and 25 per cent for power. **Distribution:** 2¼ mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 6 line transformers, of 94 k.w. total capacity. Number of consumers, 82; connected load, 80 h.p. for lighting and 35 h.p. in motors. Value of system, $5,151. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $15 per lamp per year.

ST. JACOB, Waterloo Co. (129†). Supplied, under public control, from the Niagara system of the Hydro-Electric Power Commission. Amount taken, 75 h.p. **Distribution:** 3 mi. of streets; 8 line transformers, of 55 k.w. total capacity; connected load, 50 h.p. for lighting and 75 h.p. in motors.

ST. MARYS, Perth Co. (3,960*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission. The cement company is also supplied from the same source.

Municipal System—489 h.p is taken by this system, at $28 per h.p.-year at 13,200 volts. **Substation:** Three 150-k.v.a. station transformers step voltage down from 13,200 v. to 2,200 v., at 3 ph., 25 cy. Earnings divided, 59 per cent for lighting and 41 per cent for power. **Distribution:** 62 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 60 line transformers, of 901 k.w. total capacity. Number of consumers, 752; connected load, 800 h.p. for lighting and 877 h.p. in motors. Distribution system valued at $82,069, of which $11,838 is for the substation. **Rates:** Domestic meter rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. per month; commercial, from 0·6 cent to 6 cents per k.w.h.; power rate, from 0·15 cent to 3·1 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates are subject to 10 per cent discount. Street lighting: 100-w. and 250-w. lamps at $13 and $25 per lamp per year.

Cement Co.—Substation: Three 150-k.w. and three 500-k.w. transformers stepping the voltage down from 13,200 v. to 575 v. at 3 ph., 25 cy. A connected power load of 3,000 h.p. is supplied.

ST. THOMAS, Elgin Co. (17,216*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 2,100 h.p., at $26 per h.p.-year at 13,200 volts. **Substation:** Three 750-k.w. station transformers step voltage down from 13,200 v. to 2,200 v. at 3 ph., 25 cy. Earnings divided, 51 per cent for lighting, 47 per cent for power and 2 per cent for miscellaneous. **Distribution:** 66 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 105 line transformers, of from 2½ k.w. to 30 k.w. capacity. Number of consumers, 3,112; connected load, 2,635 h.p. for lighting and 4,960 h.p. in motors. Distribution system valued at $211,300, of which $41,382 is for the substation. **Rates:** Domestic meter rate, from 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·4 cent to 4 cents per k.w.h.; power rate, from 0·133 cent to 1·67 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent and upward for power, according to restrictions in use. Street lighting: 500-w. and 75-w. tungsten lamps at $37.50 and $9.50 per lamp per year.

SALTFLEET TOWNSHIP, Wentworth Co. Supplied by Dominion Power and Transmission Co. from the Winona system. See under Winona.

SANDWICH, Essex Co. (3,343†). Supplied under control of Hydro-Electric Power Commission (Essex County Light and Power Co.); energy from local steam plant is also transmitted and distributed in Leamington, Amherstburg, Essex and Kingsville. Also supplied from Windsor Municipal system and from Windsor system of Sandwich, Windsor and Amherstburg Ry. See under Windsor. **Steam Plant:** Steam is purchased from the Canadian Salt Co. to operate the plant, which consists of one 750-k.w. steam turbine unit, energy being generated at 3 ph., 60 cy., 2,300 v. Three 100-k.v.a. station transformers step voltage up from 2,300 v. to 23,000 v. Maximum demand, 505 k.w.; load factor, 36·8 per cent; cost of generation, 1·6 cents per k.w.h. Plant installed in 1913, and gives continuous service. **Transmission Lines:** Energy is transmitted to the other localities served at 23,000 v., 3 ph., 60 cy. The lines are designed to transmit 1,000 k.w. with a loss of 10 per cent, and consist of wooden poles with pin-type porcelain insulators supporting No. 0 stranded aluminum cable. The line is protected with electrolytic arresters at the power station and the various transformer stations. **Substations:** The capacity of the step-down transformers of the Leamington, Amherstburg and Kingsville substations is 300 k.w. in each case, while that at Essex is 75 k.w. There are also three other outdoor transformer stations of 25 k.w. capacity each. **Distribution:** The company's distribution systems in the various places cover 13 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 220 v.; 190 line transformers, of from 1 k.v.a. to 50 k.v.a. capacity. Number of consumers, 2,025. **Rates:** There are three rates for lighting, a meter rate of from 4 to 10 cents per k.w.h.; a rate of 5 cents per k.w.h. plus a fixed charge of 10 cents per 100 sq. ft. of first floor area per month, and a flat rate of 1·2 cents per month per watt. Power rate, 1 cent per k.w.h., plus $3 per month per k.w.; for limited use a straight meter rate of 4 cents per k.w.h. is charged. All the above rates are subject to 10 per cent discount. Street lighting: see Windsor.

SANDWICH EAST TOWNSHIP, Essex Co. Supplied from Walkerville system. See Walkerville.

SARNIA, Lambton Co. (12,323*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, Pt. Edward and the Beaches being also supplied from this distribution system; amount of power taken, 1,500 h.p. at $38 per h.p.-year at 26,400 volts. **Substation:** Three 750-k.v.a. station transformers step voltage down from 26,400 v. to 4,000 v. Earnings divided, 62 per cent for lighting and 38 per cent for power. **Distribution:** 40 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 75 line transformers, of from 3 k.v.a. to 100 k.v.a. capacity. Number of consumers, 2,647; connected load, 2,745 h.p. for lighting and 2,500 h.p. in motors. Distribution system valued at $100,000. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. and 750-w. lamps, at $15 and $50 per lamp per year.

SAULT STE. MARIE, Algoma Dist. (12,829*, exclusive of Steelton). Supplied under municipal control. Purchased in block from Great Lakes Power Co.

Great Lakes Power Co. System—Hydro-electric Plant: Situated on the power canal in the city, water being diverted from St. Mary river above the rapids through a canal, 2,100 ft. long, from 130 to 200 ft. wide and from 12 to 19 ft. deep. Stone power house, 100 x 175 ft., where the head is 18 ft. Equipment: 18 vertical turbines, of 4,000 h.p. total capacity. One-half of these operate generators at 3 ph., 25 cy., 2,200 v. and the other half at 500 v., d.c. In addition, there are 24 units in a newly-built power house, each unit of 650 k.v.a. capacity at 3 ph., 2,200 v.; 20 of the generators operate at 25 cy. and 4 at 60 cy. Maximum load, 3,600 h.p. Load factor, 74 per cent. Development is also used for the paper mill, where the installed capacity is 12,000 h.p. Original installation, 1896. Continuous service. **Distribution:** Energy supplied mostly in block to Sault Ste. Marie, Steelton street railway, Lake Superior Paper Co., and other miscellaneous power consumers.

Municipal System—Energy purchased from Great Lakes Power Co. at $22 per h.p.-year at 2,200 v. Amount required, 800 k.w. Average yearly load factor, 45 per cent. Output divided, 88 per cent for lighting and 12 per cent for power. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 104 v. and 208 v.; 100 line transformers, of from 1½ k.w. to 30 k.w. capacity. Number of consumers, 2,500; connected load, 700 k.w. for lighting and 300 k.w. in motors. Value of system, $100,000. **Rates:** Domestic, 2 to 4½ cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 2 to 9 cents per k.w.h.; power rate, 0·25 cent to 2 cents per k.w.h., plus monthly fixed charge of $1 per h.p. Discount for lighting, 5 per cent, and up to 25 per cent for power, according to restriction in use. Street lighting: arc lamps, at $50 per lamp per year, and incandescent lamps of from 100 to 600 c.p., at $12 to $50 per lamp per year.

SCHOMBERG, York Co. Supplied by Toronto and York Radial Railway Co. See under Aurora.

SEAFORTH, Huron Co. (2,075*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 500 h.p. at $38 per h.p.-year at 26,400 volts. **Substation:** Three 150-k.v.a. station transformers step voltage down from 26,400 v. to 2,200 v. at 3 ph., 25 cy. **Distribution:** 11 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 41 line transformers, of from 5 k.v.a. to 20 k.v.a. capacity. Number of consumers, 425; connected load, 400 h.p. for lighting and 650 h.p. in motors. Distribution system valued at $28,584, of which $7,236 is for the substation. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area, per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-c.p. and 80-c.p. lamps, at $12 and $15 per lamp per year.

SELLWOOD, Sudbury Dist. Supplied by Moose Mountain, Limited, which obtains a block of 1,500 h.p. from the Wahnapitæ Power Co. (see Sudbury), at $16 per h.p.-year, at power plant; power mostly used for mining purposes. The company also has a steam auxiliary plant, which is practically never used. **Steam Plant:** Concrete and steel building. A 750-k.w. steam turbine unit at 3 ph., 60 cy. **Substation:** For energy from Wahnapitæ Power Co. Six 275-k.v.a. transformers, stepping voltage from 33,000 v. to 550 v. **Distribution:** Primaries at 550 v. and secondaries at 110 v.; 15 line transformers, of 102 k.w total capacity. Number of consumers, 45; connected load, 126 k.w. for lighting. Value of system, $8,000. **Rates:** 8 cents per k.w.h. to employees.

SHELBURNE, Dufferin Co. (1,018*). Supplied, under municipal control, from the Eugenia system of the Hydro-Electric Power Commission; amount taken, 88 h.p. at $30 per h.p.-year at 4,000 volts. **Substation:** Three 50-k.v.a. station transformers step voltage down from 22,000 v. to 4,000 v. at 3 ph., 60 cy. **Distribution:** 4½ mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 20 line transformers, of 160 k.w. total capacity. Number of consumers, 184; connected load, 125 k.w. for lighting and 106 h.p. in motors. Distribution system valued at $17,298, of which $566 is for the substation. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area, per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates are subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

SIMCOE, Norfolk Co. (4,032*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 133 h.p., at $35 per h.p.-year at 26,400 volts. **Substation:** Three 125-k.w. station transformers step voltage down from 26,400 v. to 4,400 v. at 3 ph., 25 cy. **Distribution:** 12½ mi. of streets, with

½ mi. underground; primaries at 4,400 v. and secondaries at 110 v. and 220 v.; 29 line transformers, of from 3 k.w. to 20 k.w. capacity. Number of consumers, 198; connected load, 235 h.p. for lighting and 140 h.p. in motors. Distribution system valued at $37,414, of which $5,852 is for the substation. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area, per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, and for restricted power, 33⅓ per cent. Street lighting: 300-w. and 75-w. lamps, at $38 and $14 per lamp per year.

SMITHS FALLS, Lanark Co. (6,268†). Supplied from two systems now under municipal control, formerly controlled, respectively, by Citizen Electric Light Co. and Smiths Falls Electric Power Co The two systems will be combined into one and supplied from Rideau system of Hydro-Electric Power Commission.

No. 1 System (Citizen Electric)—Supplied from combined hydro-electric and steam plant at Jones locks on the Rideau Canal system. **Power Plant:** Concrete-pier stop-log type dam, 125 ft. long and 8 ft. high, with two 3-ft. steel and concrete flumes and a 6 x 6 ft. wooden flume, the former two 14 ft. long, and the latter 30 ft., leading to a stone and frame building 60 x 150 ft.; head, 9 ft. Equipment: 3 vertical turbines of 300 h.p. total capacity, geared and belted through countershaft to a 135-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 115 k.w. Slight trouble from frazil ice. **Steam Plant:** One 84-h.p. return-tubular boiler, at 100 lbs. pressure, and a 125-h.p. compound condensing engine, belted to operate the same generator as the water wheel. Steam plant only used as an auxiliary from 4 to 6 hours per day in winter. Fuel: steam coal; yearly consumption, approximately 100 tons, at $10. Combined plant valued at $37,800. Estimated cost of generation, $22 per h.p.-year. Steam plant installed in 1900. Continuous service. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 57 line transformers of 258 k.w. total capacity. Number of consumers, 480; connected motor load alone, 50 h.p. Value of distribution system, $15,000. **Rates:** Domestic, 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·7 cent to 7 cents per k.w.h. Power rate, 0·15 cent to 2·5 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount.

No. 2 System (Smiths Falls Electric)—Supplied from combined hydro-electric and steam plant on Rideau river at Sly rapid, ¾ mi. below town. **Power Plant:** Wooden dam, 60 ft. long, giving a 16-ft. head, with a wooden penstock leading to a brick power house 64 x 36 ft., with a boiler room 30 x 30 ft. and wheel house 43 x 22 ft. It contains two 300-h.p. turbines, geared and belted through countershaft to a 275-k.w., 3-ph., 60-cy., 2,200-v. generator. Steam plant, which is only used as an auxiliary in the fall and winter, includes two 175-h.p. water-tube boilers and a 500-h.p. engine, belted to countershaft, also operated by water turbine. Fuel bituminous coal; yearly consumption, 600 tons, at $5.50. Maximum load, 300 k.w. Continuous service. Value of combined power plant, $85,000. Installed 1892. **Distribution:** 18 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 82 line transformers, of from 2 k.w. to 20 k.w. capacity. Number of consumers, 700; connected load, 600 k.w. for lighting and 250 h.p. in motors. Value of distribution system, $40,000. **Rates:** Same as No. 1 system. Street lighting: 100-w. and 200-w. lamps, at $19 and $24 per lamp per year, respectively.

SMITHVILLE, Lincoln Co. Supplied under municipal control, being purchased in block from Dominion Power and Transmission Co. at ·75 cent per k.w.h. **Substation:** Three 200-k.w. transformers step voltage from 44,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** 6½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 190 k.w. total capacity. Number of consumers, 103; connected motor load alone, 131 h.p. System valued at $60,000. **Rates:** Domestic, 1·5 to 10 cents per k.w.h.; power, 1·25 cents per k.w.h., plus monthly fixed charge of $1 per h.p. Street lighting: 100-w. nitro lamps at $20 per lamp per year.

SOUTHAMPTON, Bruce Co. (1,639*). Supplied by Saugeen Electric Light and Power Co. from a combined hydro-electric and steam plant on Saugeen river, 3 miles above mouth. Plant also supplies Port Elgin, 5½ miles distant. **Power Plant:** Concrete and wooden dam, 420 ft. long and 10 ft. high, with short headrace leading to concrete bulkhead adjacent to a frame power house, 20 x 40 ft., where the head is 11 ft. The hydraulic equipment includes a 350-h.p. turbine, geared and belted through a countershaft to a 200-k.w., 3-ph., 60-cy., 6,600-v. generator. **Steam Plant:** Two 80-h.p. return-tubular boilers at 110 lbs. pressure and a 200-h.p. compound engine, belted to a countershaft from which above generator is operated. Steam is only used as an auxiliary to hydraulic plant. Interruptions to latter mainly due to backwater and slush ice. Installed in 1906 and gives continuous service. Valued at $90,000. **Transmission Lines:** Extend both to Southampton, 3 mi., and Port Elgin, 5½ mi.; operate at 6,600 v., 3 ph., each line single circuit, 3 conductors, supported on pin-type insulators on wooden poles. Estimated value of lines, $20,000. **Substations:** At Southampton, two 100-k.w. transformers step voltage from 6,600 v. to 2,300 v., 3 ph., 60 cy. At Port Elgin, one 75-k.w. and one 60-k.w. transformer step voltage from 6,600 v. to 2,300 v. and 2 of 37½ k.w., stepping voltage to 440 v. at 3 ph., 60 cy. **Distribution:** For Southampton only, 9½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 22 line transformers, of from 1 k.w. to 15 k.w. capacity. Number of consumers, 285; connected load, 198 k.w. Value of system, $12,000. **Rates:** Domestic, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, 0·15 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.; all rates subject to 10 per cent discount. Street lighting: 60-w. and 100-w. tungsten lamps, at $14 per lamp per year.

SOUTH PORCUPINE, Timiskaming Dist. Supplied by Northern Ontario Light and Power Co., a block of 100 k.w. being obtained from the Northern Canada Power Co. (see under Timmins) at 1·75 cents per k.w.h. at 12,000 v. **Substation:** Three 100-k.w. station transformers step voltage down from 12,000 v. to 2,200 v., 3 ph., 25 cy. **Distribution:** 4 mi. of streets; 10 line transformers, of 70 k.w. total capacity. Number of consumers, 300; connected load, 30 k.w. for lighting and 15 h.p. in motors. **Rates:** Lighting, 9 cents per k.w.h.; heating, 3 and 4 cents per k.w.h. Street lighting: 100-w. nitro lamps, at $21.66 per lamp per year.

SOUTH RIVER, Parry Sound Dist. (494*). Supplied by South River Electric Co. from a hydro-electric plant on South river, ¼ mi. north of town. System also includes Sundridge. **Hydro-Electric Plant:** Concrete dam, 80 ft. long and 16 ft. high. Brick power house, 28 x 32 x 14 ft., where the head is 64 ft., contains a 125-h.p. and a 335-h.p. turbine, direct connected, respectively, to an 80-k.v.a., and a 180-k.v.a., 3-ph., 60-cy., 4,000-v. generator. Maximum load, 90 k.w., divided, 45 per cent for lighting and 55 per cent for power. Continuous service. Value of plant, including distribution system, $50,000. Installed in 1911, extended, 1918. **Distribution:** Including Sundridge, 12 mi. of streets; primaries at 4,000 v. and 2,200 v., and secondaries at 110 v. and 220 v.; 15 line transformers, of 100 k.w. total capacity. Number of consumers, 130; connected load, 35 k.w. for lighting, 100 h.p. in motors, and 12 k.w. in appliances. **Rates:** Flat lighting rate, 1 cent per watt per month, less 25 per cent discount for tungsten and 25 cents per 16-c.p. per month for carbon lamps. Power, $25 to $48 per h.p.-year, according to service.

SPRINGFIELD, Elgin Co. (422*). Supplied, under municipal control, from the Tillsonburg substation of the Niagara system of the Hydro-Electric Power Commission; amount taken, 20 h.p., at $65 per h.p.-year at 2,200 volts. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 3 line transformers, of 15 k.w. total capacity. Number of consumers, 57; connected load, 27 k.w. for lighting, 21 h.p. in motors, and 4 k.w. in appliances. Distribution system valued at $5,500. **Rates:** Domestic meter rate, from 4 to 8 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 8 to 16 cen s per k.w.h.; power rate, from 0·15 cent to 7·8 cents per k.w.h.,

plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $20 per lamp per year.

STAMFORD TOWNSHIP, Welland Co. Supplied, under public control, from the Niagara system (Ontario Power Co.) of the Hydro-Electric Power Commission; amount taken, 450 h.p., at $16.57 per h.p.-year at 2,200 volts. **Substation:** Three 175-k.w. station transformers step voltage down to 2,200 v. at 3 ph., 25 cy. **Distribution:** 11 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 440 v. Number of consumers, 215; connected load, 60 k.w. for lighting and 475 h.p. in motors. Distribution system valued at $29,000. **Rates:** Lighting rate, 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; power rate, from 0·133 cent to 1·67 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. Street lighting: 100-w. lamps, at $8 per lamp per year.

STAYNER, Simcoe Co. (990*). Supplied, under municipal control, from the Severn system of the Hydro-Electric Power Commission; amount taken, 75 h.p. at $35 per h.p.-year at 4,000 volts. **Substation:** Three 100-k.v.a. station transformers step voltage down from 25,000 v. to 4,000 v. at 3 ph., 60 cy.; earnings divided, 59 per cent for lighting and 41 per cent for power. **Distribution:** 10 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 14 line transformers, of 115 k.w. total capacity. Number of consumers, 190; connected load, 60 h.p. for power alone. Distribution system valued at $15,284. **Rates:** Domestic meter rate, from 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·9 cent to 9 cents per k.w.h.; power rate, from 0·3 cent to 4·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. and 100-w. lamps at $9 and $12 per lamp per year.

STEELTON (now part of Sault Ste. Marie) Algoma Dist. (5,603*). Supplied under municipal control. Energy purchased from Great Lakes Power Co. (see under Sault Ste. Marie), at $22 per h.p.-year. **Distribution:** 9½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 15 line transformers of 175 k.w. total capacity. Number of consumers, 740; connected load, 233 k.w. for lighting, and 225 h.p. in motors. Value of system $35,000. **Rates:** Lighting, 2 to 10 cents per k.w.h.; power, 1·5 to 2 cents per k.w.h. Street lighting: 100-c.p. lamps, at $15 per lamp per year.

STIRLING, Hastings Co. (823*). Supplied, under municipal control, from the Central Ontario system of the Hydro-Electric Power Commission; amount taken, 80 h.p., at $20 per h.p.-year at 2,400 volts. **Substation:** One 75-k.w. and one 100-k.w. station transformer step voltage down from 44,000 v. to 2,400 v.; output divided, 69 per cent for lighting and 31 per cent for power; yearly load factor, 53 per cent. **Distribution:** 4½ mi. of streets; primaries at 2,400 v. and secondaries at 120 v. to 550 v.; 15 line transformers, of from 1 k.w. to 10 k.w. capacity. Number of consumers, 230; connected load, 114 k.w. for lighting, 69 k.w. for appliances and 28 k.w. in motors. Distribution system valued at $6,500. **Rates:** Flat lighting rate, from $1.50 to $2.60 per 60-w. per year, according to uses; meter rate, from 3 to 4 cents per k.w.h.; flat power rate, from $10 to $18 per h.p.-year, according to amount and restrictions. Street lighting: 60-w. tungsten lamps, at $8 per lamp per year.

STONEY CREEK, Wentworth Co. Supplied by the Dominion Power and Transmission Co from the Winona system. See under Winona.

STOUFFVILLE, York Co. (1,020*). Supplied from a municipal producer-gas plant. **Power Plant:** Concrete building, 40 x 40 ft. A gas producer supplies a 60-h.p. gas engine, belted to a 40-k.w., single-ph., 60-cy., 1,100-v. generator. Fuel: semi-anthracite coal, 400 lbs. per night at $7 per ton. Maximum demand, 25 k.w. Night service only. Installed in 1917. Value, $7,900. Formerly had a steam plant installed in 1900. **Distribution:** Primaries at 1,100 v. and secondaries at 110 v.; 10 line transformers, of from 5 k.w. to 7½ k.w. capacity. Number of consumers, 185. **Rates:** 10 cents per k.w.h. Street lighting: incandescent lamps, total yearly cost, $800.

STRATFORD, Perth Co. (17,371*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 1,800 h.p., at $27 per h.p.-year at 26,400 volts. **Substation:** Three 750-k.w. station transformers step voltage down from 26,400 v. to 2,200 v., at 3 ph., 25 cy.; output divided, 41 per cent for lighting and 59 per cent for power. **Distribution:** 49 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 133 line transformers, of from 2 k.w. to 30 k.w. capacity. Number of consumers, 2,553; connected load, 3,000 h.p. for lighting and 1,485 h.p. in motors. **Rates:** Domestic meter rate, from 1·25 to 2·5 cents per k.w.h., plus 3 cents per 100 sq. ft. of floor area per month; commercial, from 0·5 cent to 5 cents per k.w.h.; power rate, from 0·15 cent to 2·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 500-w. nitro at $40 to $50 per lamp and 100-w. incandescent lamps at $10 per lamp per year.

STRATHROY, Middlesex Co. (2,816*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 250 h.p., at $44.07 per h.p.-year, at 13,200 volts. **Substation:** Three 75-k.v.a. station transformers step voltage down from 13,200 v. to 2,300 v. at 3 ph., 25 cy. Output divided, 37 per cent for lighting and 63 per cent for power. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 32 line transformers, of from 5 k.v.a. to 30 k.v.a. capacity. Number of consumers, 474; connected load, 660 h.p. for lighting and 385 h.p. in motors. Distribution system valued at $20,109. **Rates:** Domestic meter rate, from 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 3·6 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-c.p. and 250-c.p. nitro lamps, at $14 and $23 per lamp per year.

STREETSVILLE, Peel Co. (550†). Supplied under municipal control, being partly obtained from a local hydro-electric plant, while a block of 275 h.p. is obtained from the Niagara system of the Hydro-Electric Power Commission at $26 per h.p.-year at 4,000 volts. **Hydro-Electric Plant:** Situated on the Credit river, within the town limits; concrete dam 150 ft. long and 12 ft. high, with an adjacent stone power house 40 x 30 ft.; available head, 12 ft. Equipment: two turbines, of 120 h.p. total capacity, both belted to the same 120-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 100 h.p. Slight trouble sometimes experienced from low water. The plant, which operates at night only, was installed in 1907, and is valued at $25,000. **Substation:** For energy received from the Hydro-Electric Power Commission, three 50-k.w. station transformers, stepping voltage down from 13,200 v. to 2,200 v. at 3 ph., 25 cy. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 20 line transformers, of 200 k.w. total capacity. Number of consumers, 108; connected load, 75 k.w. for lighting, 250 h.p. in motors and 15 k.w. in appliances. Distribution system valued at $18,000. **Rates:** Meter lighting rate, 6 cents per k.w.h.; flat power rate, $26 per h.p.-year. Street lighting: 100-w. tungsten lamps at $10 per lamp per year.

STURGEON FALLS, Nipissing Dist. (3,443*). Supplied by Northern Ontario Light and Power Co. Purchased from the Spanish River Pulp and Paper Mills. System also includes Cache Bay.

Spanish River Pulp and Paper Mills—Hydro-Electric Plant: Operated in connection with the mill. Situated on Sturgeon river, at Sturgeon Falls. Wooden crib dam, 120 ft. long and 13 ft. high; adjacent power house, 52 x 70 ft. containing two turbines of 1,339 h.p. and 1,900 h.p., respectively, direct connected to a 560-k.w. and a 1,375-k.w. generator, the former being 3 ph., 25 cy., 440 v. and the latter 3 ph., 60 cy., 2,200 v. Maximum demand, full capacity of the plant, but only 175 h.p. is supplied for distribution. Total development, including the mill equipment, has an installed capacity of 9,221 h.p. Value of plant, $80,000. Cost of generation, $15 per day. Plant gives continuous service. Installed in 1900.

Northern Ontario Light and Power Co.—A block of 175 h.p. is purchased from the Spanish River Pulp and Paper Mills, at 1·5 cents per k.w.h. **Distribution:** Including Cache Bay, 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 37 line transformers, of from 1 k.w. to 30 k.w. capacity. Number of consumers, 400; connected load, 140 k.w. for lighting, 2 k.w. for power and 25 k.w. for appliances. **Rates:** Lighting, 8 cents net per k.w.h.; power flat rate, $40 to $60 per h.p.-year; power and appliances meter rate, 3 to 4 cents per k.w.h. Street lighting: 40-w. and 100-w. tungsten lamps, at $10 and $20 per lamp per year.

SUDBURY, Sudbury Dist. (7,042*). Supplied under municipal control, being obtained in block from Waenapitei Power Co., which has two hydro-electric plants on the Waenapitei river.

Waenapitei Power Co.—No. 1 Hydro-electric Plant: Situated 10 mi. from Sudbury and 2 mi. below Waenapitei. Timber dam, 250 ft. long and 38 ft. high; water led through three steel penstocks, two of 8 ft. and one of 9 ft. diameter, 250 ft. long; masonry power house, 84 x 54 ft.; head, 52 ft. Equipment: 3 turbines of 3,500 h.p., 1,800 h.p. and 1,300 h.p., direct connected, respectively, to a 2,500-k.w., 1,250-k.w. and 800-k.w., generator, all of 3 ph., 60 cy., 2,300 v.; two 535-k.w. and two 300-k.w. station transformers, stepping voltage from 2,300 v. to 22,500 v. at 3 ph., 60 cy. Maximum load, practically full capacity of plant. Installed in 1905. Valued at $320,000. Continuous service. **No. 2 Hydro-Electric Plant:** 16 mi. below No. 1 plant. Concrete dam, 190 ft. long and 20 ft. high, with two 9½-ft. steel penstocks, 30 ft. long, leading to power house; head, 38 ft. Two 1,800-h.p. turbines, each direct connected to a 1,250-k.w., 3-ph., 60-cy., 2,300-v. generator, and three 650-k.w. station transformers stepping voltage from 2,300 v. to 22,500 v. at 3 ph., 60 cy. Installed in 1912. Valued at $250,000. Continuous service. **Transmission Lines and Substations:** Energy is transmitted from the power plants at 22,500 v., the total mileage of lines being 26 mi., extending between the two power plants and from No. 1 plant to Sudbury, where the company supplies energy in block to the municipality, but also distributes to power installations of 5 h.p. and over. Power is also supplied from the transmission system to the Mond Nickel Co., the Moose Mountain Co., the Dominion Nickel Co. and the Canadian Exploration Co. The various substations have the following equipment: Sudbury, four 200-k.w. and two 500-k.w. transformers stepping voltage from 22,000 v. to 2,300 v., 3 ph., 60 cy.; Mond Nickel Co., three 1,000-k.w. transformers, stepping voltage from 16,500 v. to 2,300 v., 3 ph., 60 cy.; Moose Mountain Co. (Sellwood), three 600-k.w. transformers, stepping voltage from 33,000 v. to 2,300 v., 3 ph., 60 cy., this substation also supplying Dominion Nickel Co.; Canadian Exploration Co., three 200-k.w. transformers, stepping voltage from 15,000 v. to 2,300 v., 3 ph., 60 cy. **Sudbury Distribution:** For power installations of 5 h.p. and over, 5 mi. of streets; 44 line transformers, of from 1 to 40 k.w. capacity; primaries at 2,200 v. and secondaries at 110 v. to 550 v. Number of consumers, 19; connected load, 419 h.p. Value of distribution system, $9,000. **Rates:** Energy is sold in block, based on a charge of from $14 to $16 per h.p. at the power house. Power rate in Sudbury, $25 per h.p.-year.

Municipal Distribution System—Obtained from Wahnapitæ Power Co., at $35 per k.w. per year at 2,300 v. Amount taken, 500 k.w. **Distribution:** 19¾ mi. of streets, with ½ mi. underground; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 60 line transformers, of 480 k.v.a. total capacity. Number of consumers, 1,650; connected load, for power alone, 280 h.p., for appliances, 185 k.w. **Rates:** Lighting, 8 cents per k.w.h.; appliances, 1·5 to 2·5 cents per k.w.h.; power, 0·5 cent to 3 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional 10 per cent for large consumption for lighting. Street lighting: luminous arcs, at $51 per lamp per year, and 100-c.p. to 1,000-c.p. nitro lamps, at $7.30 per 100 c.p. per year.

SULPHITE, Hastings Co. (300†). Supplied from Central Ontario system of the Hydro-Electric Power Commission, being used almost entirely for power purposes. Amount taken, 875 h.p., which is distributed both at 4,000 v. and 240 v. **Substation:** One 300-k.v.a. and

two 240-k.v.a. station transformers, stepping voltage down from 44,000 v. to 4,000 v. This substation also supplies Tweed.

SUNDERLAND, Ontario Co. (400†). Supplied, under municipal control, from the Cannington substation on the Wasdell system of the Hydro-Electric Power Commission; amount taken, 50 h.p., at $50 per h.p.-year at 4,000 volts. Earnings divided, 90 per cent for lighting and 10 per cent for power. **Distribution:** 3 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 70 k.w. total capacity. Number of consumers, 80; connected load, 30 k.w. for lighting and 30 h.p. in motors. Distribution system valued at $6,715. **Rates:** Domestic meter rate, from 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1·2 to 12 cents per k.w.h.; power rate, from 0·4 cent to 4·5 cents per k.w.h, plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $13 per lamp per year.

SUNDRIDGE, Parry Sound Dist. (454*). See South River.

SUTTON WEST, York Co. (750*). Supplied by A. J. Lowick & Son, from a hydro-electric plant connected with their flour mill. **Hydro-Electric Plant:** Concrete dam, 58 ft. long and 10 ft. high, with a concrete flume of 9 x 6 ft. section and 70 ft. long, leading to plant, which is installed in flour mill, where the average head is 11½ ft. Two 50-h.p. turbines, geared and belted to a 32-k.w., 220-v., d.c. generator. Slight trouble is sometimes experienced from shortage of water and back water. Night service only. **Distribution:** 2 mi. of streets, at 220 v., d.c. Number of consumers, 88, for lighting only. Value of distribution system, $2,000. **Rates:** Flat rate, 25 cents per 40-w. lamp per month. Street lighting: 40-w. lamps, at $10 per lamp per year.

TAMWORTH, Lennox and Addington Co. (300†). Supplied from hydro-electric plant of A.B. Carscallen, on Salmon river, development being also used in connection with grist mill. **Hydro-Electric Plant:** Concrete dam, 12 ft. high and 120 ft. long, with adjacent power house. Head, 11 ft. Equipment, one 35-h.p. turbine, belted to a 28-k.w., 115 v., d.c. generator. Night service only. Installed in 1912. **Distribution:** 1½ mi. of streets at 110 v., d.c. Number of consumers, 64. **Rates:** Flat rate, 20 to 25 cents per 25-w. lamp per month. Street lighting: 60-w. lamps, at $12 per lamp per year.

TARA, Bruce Co. (620*). Supplied, under municipal control, from Eugenia system of Hydro-Electric Power Commission. Substation located at Kilsyth, the latter place being included. Amount taken, 50 h.p., at $31 per h.p.-year. **Substation:** One 75-k.v.a., 3-ph. station transformer, stepping voltage from 22,000 v. to 4,000 v. at 60 cy. **Distribution:** 4 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 3 line transformers, of 30 k.w. total capacity. Number of consumers, 50; connected load, 30 k.w. for lighting. Value of distribution system, $3,000. Street lighting: 100-w. tungsten lamps.

TAVISTOCK, Oxford Co. (974*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 350 h.p., at $37.01 per h.p.-year at 575 volts. **Substation:** Three 75-k.v.a. station transformers step voltage down from 26,400 v. to 575 v., 3 ph., 25 cy., and three of 25 k.v.a. step voltage from 575 v. to 2,200 v. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 6 line transformers, of 150 k.w. total capacity. Number of consumers, 160; connected load, 40 h.p. for lighting and 305 h.p. in motors. **Rates:** Domestic meter rate, 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1 cent to 0 cents per k.w.h.; power, from 0·15 to 3·9 cents per k.w.h., plus a fixed charge of $1 per h.p. monthly. All rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $16 per lamp per year.

TECUMSEH, Essex Co. See Walkerville.

TEESWATER, Bruce Co. (832*). Supplied by Teeswater Electric Light Co., from a combined hydro-electric and steam plant on Teeswater river. **Hydro-Electric Plant:** Plant ¾ mi. from town; building 12 x 20 ft., and includes a steam auxiliary. Hydraulic equipment operates under a head of 14 ft.; a 50-h.p. turbine is belted to a 45-k.w., single-ph., 133-cy., 1,100-v. generator. Steam equipment: one 75-h.p. boiler and a 50-h.p. engine, operating a 25-k.w., 1,100-v., 2-ph., 133-cy. generator. Maximum load, 22 k.w. Installed in 1912. Value, $2,000. **Distribution:** 4 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 5 line transformers, of from 2½ to 5 k.w. capacity. Number of consumers, 100. Distribution system valued at $2,500. **Rates:** Meter rate, 12 cents per k.w.h. Street lighting: 60-c.p. and 100-c.p. lamps, at $10 and $15 per lamp per year, respectively.

THAMESFORD, Oxford Co. (381†). Supplied, under municipal control, from the Dorchester substation of the Niagara system of the Hydro-Electric Power Commission; amount taken, 50 h.p., at $45 per h.p.-year at 4,000 volts. **Distribution:** 2 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 89 k.v.a. total capacity. Number of consumers, 95; connected load, 60 h.p. for lighting and 57 h.p. in motors. Distribution system valued at $5,797. **Rates:** Domestic meter rate, from 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 1 cent to 10 cents per k.w.h.; power rate, from 0·15 cent to 5·2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

THAMESVILLE, Kent Co. (742*). Supplied from Niagara system of Hydro-Electric Power Commission; amount taken, 45 h.p., at $45.40 per h.p.-year at 4,000 volts. **Substation:** Three 75-k.w. transformers step voltage from 26,400 v. to 4,000 v. Energy all for lighting. **Distribution:** 2 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; line transformers of a total value of $977. Number of consumers, 196; connected load, 252 h.p. for lighting alone. Value of distribution system, $11,480. **Rates:** Domestic, 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1·2 to 12 cents per k.w.h.; power, 0·15 cent to 4·7 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $15 per lamp per year.

THEDFORD, Lambton Co. (590*). Supplied by George Coultis & Son from a steam-power plant. **Steam Plant:** Concrete building, 20 x 30 ft., boiler house 30 x 50 ft. Equipment: one 80-h.p. return-tubular boiler at 100 lbs. pressure; one 80-h.p. engine, belted to a 40-k.w., single-ph., 133-cy., 1,100-v. generator. Fuel: mill refuse. Maximum load, 15 k.w. Value of plant, $8,000. Cost of generation, 7 cents per k.w.h. In operation since 1909. Night service only. **Distribution:** 5 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 9 line transformers of 42 k.w. total capacity. Number of consumers, 66; connected load, for lighting alone, 50 k.w. Value of distribution system, $2,000. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting: 60-w. lamps, at $15 per lamp per year.

THESSALON, Algoma Dist. (1,828*). Supplied from municipal steam plant. **Steam Plant:** Two stone buildings, 34 x 40 ft. and 16 x 24 ft., also used for waterworks purposes. Equipment: one 110-h.p. and one 40-h.p. return-tubular boiler, 118 lbs. pressure; one 80-h.p. engine, belted to a 60-k.w., single-ph., 125-cy., 1,040-v. generator. Maximum load, 60 k.w. Fuel: soft wood; cost per year, $3,600. Night service only. Value of plant, $3,000. Installed in 1901. **Distribution:** 1½ mi. of streets; primaries at 1,040 v. and secondaries at 104 v.; 22 line transformers, of 69 k.w. total capacity. Number of consumers, 188. Value of distribution system, $8,000. **Rates:** 10 cents per k.w.h. Street lighting: twelve arc lamps and seventeen 60-w. tungsten lamps; total charge, $800 per year.

THISTLETOWN, York Co. (171†). See West Toronto.

THORNBURY, Grey Co. (718*). Supplied from municipal hydro-electric plant on Beaver river in the town. **Hydro-Electric Plant:** Concrete dam, 100 ft. long and 20 ft. high, with a wooden flume, 6 ft. square and 150 ft. long. Head, 20 ft. Frame power house, 16 x 24 ft., containing a 75-h.p. turbine, belted to a 60-k.w., single-ph., 125-cy., 1,040-v. generator. Maximum demand, 50 h.p. Night service only. Installed in 1913. Value of plant, $29,000, including dam and flour mill. **Distribution:** 3 mi. of streets; primaries at 1,040 v. and secondaries at 110 v.; 20 line transformers, of from 1½ k.w. to 15 k.w. capacity. Number of consumers, 160; connected load, 30 k.w. for lighting and 1 h.p. in motors. Value of system, $2,000. **Rates:** 6 cents per k.w.h. Street lighting: 60-w. tungsten lamps, at $4 per lamp per year.

THORNDALE, Middlesex Co. Supplied, under municipal control, from the Dorchester substation on the Niagara system of the Hydro-Electric Power Commission; amount taken, 75 h.p., at $45 per h.p.-year at 4,000 v. Earnings divided, 69 per cent for lighting and 31 per cent for power. **Distribution:** 1 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 6 line transformers of $964, total value. Number of consumers, 66; connected load, 15 h.p. for lighting and 60 h.p. in motors. Value of system, $3,550. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power, 0·15 cent to 5·2 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

THOROLD, Welland Co. (4,548*). Supplied, under municipal control, from a hydro-electric plant; 200 h.p. also purchased from the Niagara system (Ontario Power Co.) of the Hydro-Electric Power Commission at 0.75 cent per k.w.h. at 2,200 v. **Hydro-Electric Plant:** Water taken from old Welland canal through a flume 30 ft. long. Head, 12 ft. Brick power house, 60 x 30 ft., containing one 220-h.p. turbine belted to a 120-k.w.,; single-ph., 60-cy., 2,400-v. generator. Continuous service. Maximum load, 250 h.p.. including purchased energy, a total of 350 h.p. Value of plant, $15,000. Installed 1888. **Distribution:** 19 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 30 line transformers, Number of consumers, 800. Value of distribution system, $10,000. **Rates:** 3 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; cooking rates, 2 cents per k.w.h. All rates less 25 per cent discount. Street lighting: 60-w. tungsten lamps, at $6 per lamp per year.

TILBURY, Kent Co. (1,605*). Supplied, under municipal control, from Niagara system of Hydro-Electric Power Commission; amount taken, 68 h.p., at $39.45 per h.p.-year at 4,000 v. **Substation:** Three 100-k.w. transformers step voltage from 26,000 v. to 4,000 v., 3 ph., 25 cy. Earnings divided, 97 per cent for lighting and 3 per cent for power. **Distribution:** 4 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 11 line transformers, of 69 k.w. total capacity. Number of consumers, 205; connected load, 245 h.p. for lighting and 25 h.p. in motors. Value of system, $14,172. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power, 0·15 cent to 4·3 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount.

TILLSONBURG, Oxford Co. (3,059*). Supplied, under municipal control, from Niagara system of the Hydro-Electric Power Commission; amount taken, 474 h.p. at $35 per h.p.-year at 13,200 v. **Substation:** Three 150-k.w. transformers step voltage from 13,200 v. to 2,200 v., at 3 ph., 25 cy. Output divided, 36 per cent lighting and 64 per cent power. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; line transformers of 330 k.v.a. total capacity. Number of consumers, 700; connected load, 640 h.p. for lighting and 683 h.p. in motors. Value of system, $23,465. **Rates:** Domestic, 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial,

1·75 to 7 cents per k.w.h.; power, ·15 cent to 3·8 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 80-c.p. gas-filled lamps, at $11 per lamp per year.

TIMMINS, Timiskaming Dist. (3,229*). Supplied by Northern Ontario Light and Power Co. Purchased in block from Northern Canada Power Co.

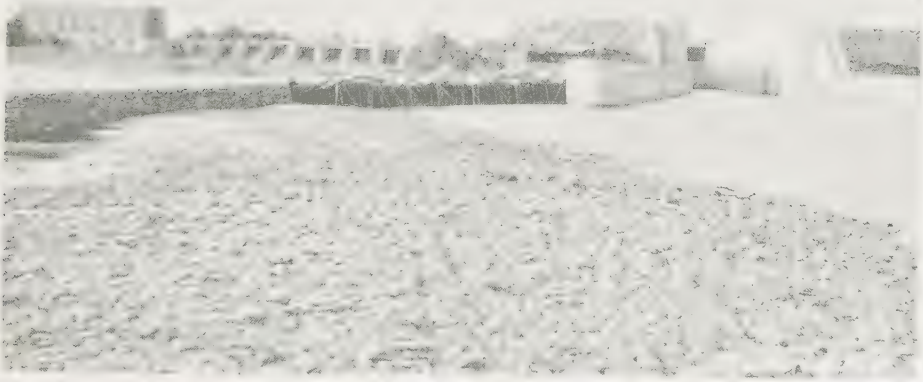
Northern Canada Power Co. System—Electric energy obtained from two hydro-electric plants on Mattagami river, one at Wawaitin and the other at Sandy falls. The greater portion of the energy is supplied for mining purposes in the district. **Wawaitin Plant:** Concrete dam, 950 ft. long and 17 ft. high, partly of stop-log sluice type, with an open channel, 1,200 ft. long and 50 ft. wide, whence water is led a total distance of 2,600 ft. through wood-stave and steel pipes, of 7 ft. to 9 ft. diameter, with surge tanks, to a concrete and steel power house, 57 x 59 ft., with an addition 61 x 50 ft. Head, 125 ft. Equipment: two 3,200-h.p. horizontal turbines and one 4,000-h.p. vertical turbine, direct connected, respectively, to two 2,500-k.w. and one 3,750-k.w., 3-ph., 25-cy., 12,000-v. generators. Maximum load adjusted between the two plants. Cost of plant $2,000,000. Continuous service. Installed in 1912. **Sandy Falls Plant:** Concrete dam, 1,200 ft. long and 12 ft. high, with an additional 4 ft. with flashboards. Three conduits, one 8-ft. steel, one 8-ft. wood-stave and one 11½ ft. wood-stave, from 500 to 600 ft. in length, lead to frame and corrugated iron power house, 40 x 168 ft. Head, 33 ft. Equipment: two 1,250-h.p. horizontal turbines and one 2,500-h.p. vertical turbine, direct connected, respectively, to two 950-k.w. and one 1,875-k.w., 3-ph., 25-cy., 12,000-v. generators. Cost of plant, $1,500,000. Continuous service. Installed in 1912. Combined maximum load, 7,000 k.w., adjusted between the two plants; average load factor, 85 per cent. Shortage of water has been remedied by two conservation dams, one 25 mi. above Wawaitin with storage capacity of 2,510 million cu. ft., and one on the Grassy river, 20 mi. above Sandy falls, with 3,620 million cu. ft., while two others which will afford an additional 3,000 million cu. ft. are under construction. **Transmission Lines:** These extend to Timmins and South Porcupine and various mines of the district. They operate at 12,000 v., 3 ph., 25 cy. and cover some 40 mi. They are designed to transmit 7,000 k.w. at a loss of 12 per cent. Lightning protection, electrolytic arresters. The various mines and substations supplied, with the transmitted amount of power, are as follows: Hollinger, 4,000 h.p.; Dome Mine, 3,000 h.p.; McIntyre, 1,200 h.p.; Porcupine Crown, 500 h.p.; Vipond and North Thompson, 400 h.p.; Schumacher Syndicate, 300 h.p.; Dome Lake Mining and Milling Co., 300 h.p.; West Dome Consolidated, 150 h.p.; town of Timmins, 150 k.w. and South Porcupine, 100 k.w. **Rates:** Power rate to mines, $50 per h.p.-year.

Timmins Distribution System—This is controlled by the Northern Ontario Light and Power Co., 150 k.w. being obtained from the Northern Canada Power Co. at 1·75 cents per k.w.h. at 12,000 v. **Substation:** Three 50-k.w. transformers step voltage down from 12,000 v. to 2,200 v. at 3 ph., 25 cy. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v., 30 line transformers, of 291 k.w. total capacity. Number of consumers, 950; connected load, 60 k.w. for lighting and 35 h.p. in motors. **Rates:** Lighting, 9 cents per k.w.h.; heating, 3 and 4 cents per k.w.h. Street lighting: 100-w. nitro lamps, at $21.66 per lamp per year.

TORONTO, York Co. (473,829†). Supplied by two systems, the Toronto Hydro-Electric, under municipal control, and the Toronto Electric Light Co.

Toronto Hydro-electric System—Energy obtained from Niagara system of Hydro-Electric Power Commission; 65,000 h.p. being purchased by municipality at terminal station at 13,200 v. at $14.50 per h.p.-year. **Substations:** There are 24 substations throughout the city, interconnected by a system of trunk lines at 13,200 v. The total station transformer capacity is approximately 75,000 k.v.a., the transformers stepping voltage down to 4,150 v., 2,300 v. and 575 v., being both in single-ph. and 3-ph. units, their capacity ranging from 150 k.v.a. to 1,500 k.v.a. There are, in addition, converters and motor-generators of a total capacity of 7,000 k.w., in units of 500 k.w. and 1,000 k.w., supplying direct current at 250

GANANOQUE ELECTRIC LIGHT AND WATER SUPPLY CO.—HYDRO-ELECTRIC PLANT AT KINGSTON MILLS, FRONTENAC CO., ONT.



ONTARIO HYDRO-ELECTRIC POWER COMMISSION—HYDRO-ELECTRIC PLANT, FRANKFORD, HASTINGS CO., ONT., CENTRAL ONTARIO SYSTEM, TRENT CANAL.

v. to 600 v. for industrial power in a limited down town area and for civic railway purposes. Total yearly output, approximately, 171,700,000 k.w.h., divided into 118,300,000 for power, 30,000,000 for lighting, 19,200,000 for street lights and 4,200,000 for street railway; annual load factor, approximately 46·5 per cent. **Distribution:** 432 mi. of streets, with 12 mi. underground; primaries at 2,300 v. and secondaries at 115 v. to 575 v.; 2,500 line transformers, of from 1½ to 100 k.w. capacity. Number of consumers, 52,700; connected load, 50,404 h.p. for lighting and appliances and 118,116 h.p. in motors. Value of system, $8,428,415, of which $1,881,893 is for substations. **Rates:** Domestic, 1 cent to 2 cents per k.w.h. plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·5 cent to 5 cents per k.w.h.; power, 0·15 cent to 1·5 cents per k.w.h., plus $1 to $1.25 per h.p. monthly fixed charge. All rates subject to 10 per cent discount for lighting and 20 per cent for power. Street lighting: 100-w. tungsten lamps, at $8 per lamp per year; also a few larger type lamps.

Toronto Electric Light Co's. System—Supplied from Toronto Power Co. Energy transmitted from Niagara at 60,000 v. (See Toronto Power Co. under Niagara Falls.) There is also a steam auxiliary plant in the city. Maximum demand on system, approximately 32,000 h.p. **Steam Plant:** 7,752 h.p. in water tube boilers and 14,500 k.w. in steam turbine units; also motor-generator units, and two 3,360-amp. storage batteries at 250 v. **Substations:** Energy is stepped down from 60,000 v. to 12,500 v. at 3 ph., 25 cy. for inter-substation feeders, and from the latter voltage to 4,000 v. and 2,200 v. for local primary distribution. The total equipment comprises 25,000 k.v.a. in station transformers; 3,750 k.w. in frequency changers, from 25 cy. to 60 cy.; 1,000 k.w. in synchronous converter and 10,000 k.w. in motor-generators. Secondary distribution, 115 v. to 550 v., a.c., and 115 v. to 480 v., d.c.

TORONTO TOWNSHIP, York Co. (5,008*). Supplied, under public control, from the Niagara system of the Hydro-Electric Power Commission. It is supplied from Cooksville and Port Credit substations; total amount taken, 87 h.p., at $25 per h.p.-year at 2,200 v. Among the more important hamlets included in this system are Erindale, Cooksville, Dixie, and Clarkson. A hydro-electric plant is situated at Erindale, which may be used as an auxiliary. **Erindale Hydro-electric Plant:** Situated on the Credit river; earth dam with concrete core, 700 ft. long and 35 ft. high, whence a 900-ft. tunnel leads to a storage tank immediately adjoining the concrete power house, 45 x 90 ft.; available head, 45 feet. Equipment: two 850-h.p. turbines, each direct connected to a 600-k.w., 3-ph., 60-cy., 13,200-v. generator. Maximum load, 1,300 h.p.; plant operated from 1 to 5 hours daily, during peak load periods; installed in 1910. **Substations:** Port Credit substation described thereunder. Cooksville: three 75-k.w. station transformers step the voltage down from 13,200 v. to 2,200 v., 3 ph., 25 cy. **Distribution:** 36 mi. of streets or roads; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 72 line transformers, of 278 k.w. total capacity. Number of consumers, 244; connected load, 220 k.w. for lighting and 142 h.p. in motors. Distribution system valued at $57,100. **Rates:** Lighting rate, from 2·25 to 4·5 cents per k.w.h., plus a yearly service charge of $18; power rate, from 0·15 cent to 4·2 cents per k.w.h., plus a fixed charge of $1 per h.p. per month. All rates subject to 10 per cent discount.

TOTTENHAM, Simcoe Co. (557*). Supplied from municipal steam-power plant. **Steam Plant:** Brick building, 40 :: 36 ft., containing a return tubular boiler at 80 lbs. pressure and a 75-h.p. engine, belted to a 17-k.w. and a 30-k.w., 125-v., d.c. generator. Maximum load, 28½ h.p. Fuel: slack coal, one ton per night, at $9.53. Night service only. Value of system, including distribution, $7,000. Installed in 1903. **Distribution:** 1¾ mi. of streets, at 125 v., d.c. Number of consumers, 150. **Rates:** 10 cents per k.w.h. Street lighting: 60-w. tungsten lamps, at $21.43 per lamp per year.

TRENTON, Hastings Co. (5,169*). Supplied, under public control, from the Central Ontario system of the Hydro-Electric Power Commission; amount taken, 5,000 h.p. **Substation:** Six 100-k.v.a. and one 750-k.v.a. station transformers step the voltage down from

6,600 v. to 4,000 v.; the output divided, 14 per cent for lighting and 86 per cent for power. **Distribution:** 32 mi. of streets, with ¼ mi. underground; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 125 line transformers, of 7,250 k.w. total capacity. Number of consumers, 1,060; connected load, 1,400 k.w. for lighting and 6,400 h.p. in motors. **Rates:** Domestic lighting rate, from 1·5 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·6 cent to 6 cents per k.w.h.; thepower rate is from 0·133 cent to 1·67 cents per k.w.h., plus a montly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with an additional 10 per cent for power. Street lighting: 100-c.p. lamps, at $10 per lamp per year.

TWEED, Hastings Co. (1,350*). Supplied, under municipal control, from the Sulphide substation of the Central Ontario system of the Hydro-Electric Power Commission; amount taken, 130 h.p. Local output divided, 84 per cent for lighting and 16 per cent for power. **Distribution:** 15 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v.; 16 line transformers, of 102 k.w. total capacity. Number of consumers, 277; connected load, 250 k.w. for lighting and 55 h.p. in motors. **Rates:** Domestic lighting rate, from 2 to 4 cents, per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 0·8 cent to 8 cents per k.w.h.; power rate, from 0·15 cent to 2·8 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 40-c.p. and 60-c.p. lamps, at, respectively, $10 and $12 per lamp per year.

UXBRIDGE, Ontario Co. (1,525†). Supplied from steam-power plant of Uxbridge Electric Light Co. **Steam Plant:** Brick building, 40 x 60 ft., containing one 100-h.p return-tubular boiler at 120 lbs. pressure, and one 75-h.p. compound engine, belted to a 50-k.w., single-ph., 125-cy., 1,100-v. generator. Maximum load, 35 k.w. for lighting only. Fuel: steam coal, at $10 per ton. Originally installed 1884; various changes since. **Distribution:** Primaries at 1,100 v. and secondaries at 110 v. Number of consumers, 150; connected load, 150 k.w., practically all for lighting. **Rates:** Meter rate, 10 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $10 per lamp per year.

VANKLEEK HILL, Prescott Co. (1,577). Supplied by Vankleek Hill Electric Co., 65 h.p. being purchased from Hawkesbury Electric Co. (see Hawkesbury) at approximately $18.50 per h.p.-year. **Substation:** Two 50-k.w. transformers step voltage down from 9,000 v., 3 ph., to 120 v. and 240 v., 2 ph. **Distribution:** 3½ mi. of streets; system at 120 v. and 240 v., direct from substation. Number of consumers, 171; connected load, 48 k.w. for lighting and 5 k.w. in motors. Value of distribution system, including substation, $13,500. **Rates:** Flat rate, 35 cents per month per lamp. Meter rate, 10·5 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $10 per lamp per year.

VICTORIA HARBOUR, Simcoe Co. (1,542*). Supplied, under municipal control, from Severn system of Hydro-Electric Power Commission; amount taken, 30 h.p., at $35 per h.p.-year at 2,200 v. **Distribution:** 3 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v.; 7 line transformers, of 62 k.w. total capacity. Number of consumers 96; connected load 55 k.w. for lighting. Value of system, $7,253. **Rates:** Domestic, 1·75 to 3·5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·7 cent to 7 cents per k.w.h.; power rate, 0·15 cent to 3·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $9 per lamp per year.

WALES, Stormont Co. Supplied by the St. Lawrence Power Co. See under Cornwall.

WALKERTON, Bruce Co. (2,388*). Supplied by Walkerton Electric Light and Power Co., from a hydro-electric plant on Saugeen river, 2 miles above town. Also distributes in Formosa, 8 miles, and supplies in block to Mildmay, 6 miles. **Hydro-electric Plant:** Concrete dam, 8 ft. high and 300 ft. long. An open flume, ¼ mi. long and 30 ft. wide, with earth

embankments, leads to a concrete and brick power house, 60 x 40 ft., where head is 12½ ft. Equipment: one 285-h.p. and one 110-h.p. turbine, the first direct connected to a 150-k.v.a. and latter belted to a 75-k.v.a. generator; energy at 3 ph., 60 cy., 2,300 v. Maximum load, 225 k.v.a. Value of power plant, $104,722. Cost of generation, approximately $30 per h.p.-year. Practically continuous service. In operation since 1912. **Distribution:** Including Formosa system, 10 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 33 line transformers, of 165 k.w. total capacity. Number of consumers, 400; connected load, for power alone, 74 k.w. Value of distribution systems, $23,000. **Rates:** Domestic lighting, 2 to 9 cents per k.w.h.; commercial, 2 to 10 cents per k.w.h.; both rates subject to 10 per cent discount; power flat rate, $25 to $35 per h.p.-year; power meter rate, 0·2 cent to 4·2 cents per k.w.h., plus fixed charge of $12 per h.p.-year. Street lighting: 60-w. and 100-w. nitro lamps, at $10 and $12 per lamp per year, respectively.

WALKERVILLE, Essex Co. (5,349*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission, the system also including Ford and the township of Sandwich East. Amount taken, 1,984 h.p., at $38 per h.p.-year at 26,400 volts. **Substation:** Three 750-k.v.a. transformers step voltage from 26,400 v. to 4,000 v., and one 400-k.v.a., 3-ph. unit steps voltage from 26,400 v. to 2,300 v.; all energy at 3 ph., 25 cy. Load divided, 19 per cent lighting and 81 per cent power; load factor, 60 per cent. **Distribution:** Including Ford and Sandwich East, 26 mi. of streets and roads, with 12 mi. underground for street lighting; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; line transformers, of from 3 k.v.a. to 75 k.v.a., total capacity 2,055 k.v.a. Number of consumers, 2,183; connected load, 2,075 h.p. for lighting and 3,710 h.p. in motors. Value of systems $206,960. **Rates:** Domestic, 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·8 cent to 8 cents per k.w.h.; power rate, 0·15 cent to 3.6 cents per k.w.h., plus monthly fixed charge of $1 per h.p. Rates in Sandwich East, 10 per cent higher than above. All rates subject to 10 per cent discount. Street lighting: 60-w. tungsten lamps, at $5.60 per lamp per year in Walkerville; 100-w. tungsten lamps at $12 per lamp per year in Ford; and 60-w. tungsten lamps at $12 per lamp per year in Tecumseh.

WALLACEBURG, Kent Co. (4,107*). Supplied, under municipal control, from Niagara system of Hydro-Electric Power Commission; amount taken, 300 h.p., at $38.45 per h.p.-year at 4,000 v. **Substation:** Three 150-k.w. transformers step voltage from 26,400 v. to 4,000 v. at 3 ph., 25 cy. Earnings divided, 69 per cent lighting and 31 per cent power. **Distribution:** 18 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. to 550 v.; 55 line transformers, of 862 k.v.a. total capacity. Number of consumers, 593; connected load, 685 h.p. for lighting and 585 h.p. in motors. Value of system, $62,517, of which $760 is for substation. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power rate, 0·15 cent to 3·6 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 80-w. to 400-w. lamps, at $13.50 and $30 per lamp per year, respectively.

WARKWORTH, Northumberland Co. Supplied from hydro-electric plant of J. H. Goodrich on Burnley creek, a tributary of Trent river, one mile west. **Hydro-Electric Plant:** Earth and stone dam, 300 ft. long and 10 ft. high, with a 3-ft. flume, 100 ft. long. Head, 20 ft. Frame power house, 32 x 20 ft., containing an 80-h.p. turbine, belted to a 72-k.w., 2-ph., 60-cy., 2,200-v. generator. Maximum load, 50 h.p. Night service only. Installed in 1912. **Distribution:** 3 mi of streets and roads; primaries at 2,200 v. and secondaries at 110 v.; 5 line transformers, of 23 k.w. total capacity. Number of consumers, 60; connected load, 25 k.w. for lighting. **Rates:** Meter rate, 8 cents per k.w.h. Flat rate, 30 cents per lamp per month. Street lighting: 60-w. lamps, at $14 per lamp per year.

WATERDOWN, Wentworth Co. (696*). Supplied, under municipal control, from Niagara system of Hydro-Electric Power Commission; amount taken, 210 h.p., including the

Dominion Sewer Co., at $26 per h.p.-year at 2,300 volts. **Substation:** Three 75-k.w. transformers step voltage from 13,200 v. to 2,300 v., 3 ph., 25 cy. Earnings divided, 46 per cent lighting, 21 per cent power and 33 per cent miscellaneous. **Distribution:** 2½ mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 13 line transformers, of 134 k.w. total capacity. Number of consumers, 131; connected load, 135 h.p. for lighting and 55 h.p. in motors, exclusive of Dominion Sewer Co. Value of system, $10,716. **Rates:** Domestic, 2 to 4 cents, plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·8 cent to 8 cents per k.w.h.; power rate, 0·15 cent to 3·3 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $10 per lamp per year.

WATERFORD, Norfolk Co. (1,027*). Supplied, under municipal control, from Niagara system of Hydro-Electric Power Commission; amount taken, 150 h.p., at $39 per h.p.-year at 4,000 v. **Substation:** Three 75 k.w. transformers step voltage from 26,400 v. to 4,000 v., 3 ph., 25 cy. Earnings divided, 75 per cent lighting and 25 per cent power. **Distribution:** 5 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 100 k.w. total capacity. Number of consumers, 141; connected load, 175 h.p. for lighting and 160 h.p. in motors. Value of system, $10,430. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power rate, 0·15 cent to 4·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $14 per lamp per year.

WATERLOO, Waterloo Co. (5,091*). Supplied, under municipal control, from Niagara system of Hydro-Electric Power Commission; amount taken, 900 h.p., at $21 per h.p.-year at 13,200 v. **Substation:** Seven 150-k.w. transformers step voltage from 13,200 v. to 2,200 v., 3 ph., 25 cy. Load divided, 32 per cent lighting and 68 per cent power. **Distribution:** 14 mi. of streets, with ⅞ mi. underground; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 75 line transformers, of 808 k.w. total capacity. Number of consumers, 912; connected load, 800 h.p. for lighting, 1,300 h.p. in motors and 330 h.p. in appliances. Value of system, $51,429. **Rates:** Domestic, 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·5 cent to 5 cents per k.w.h.; power rate, 0·2 cent to 2·5 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount with additional 25 per cent for power. Street lighting: 60-w. to 150-w. nitro and tungsten lamps, at $8.75 per 100-w. lamp per month.

WATERLOO TOWNSHIP, Waterloo Co. Supplied, under public control, from the Waterloo substation on the Niagara system of Hydro-Electric Power Commission. **Distribution:** 5½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 38 line transformers, of 112 k.w. total capacity. Connected load, 22 k.w. for lighting and 100 h.p. in motors.

WATFORD, Lambton Co. (1,115*). Supplied, under municipal control, from Niagara system of the Hydro-Electric Power Commission; amount taken, 40 h.p., at $58 per h.p.-year. **Substation:** One 50-k.w., 3-ph. transformer steps voltage from 26,400 v. to 4,000 v. at 25 cy. **Distribution:** 2 mi of streets; primaries at 4,000 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 58 k.w. total capacity. Number of consumers, 161; connected load, 80 k.w. for lighting, 37 h.p. in motors and 20 k.w. in appliances. **Rates:** Domestic, 3·75 to 7·5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1·5 to 15 cents per k.w.h.; power rate, 0·15 cent to 7·1 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 60-w. and 100-w. tungsten lamps, at $18 per 100-w. lamp per year.

WAUBAUSHENE, Simcoe Co. Supplied, under municipal control, from Severn system of Hydro-Electric Power Commission; amount taken, 21 h.p., at $25 per h.p.-year at 2,300 v.

Substation: Two 25-k.v.a. transformers step voltage from 22,000 v. to 2,300 v. at 3 ph., 60 cy. Earnings divided, 97 per cent for lighting and 3 per cent for power. **Distribution:** 2 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; total value of line transformers, $240. Number of consumers, 79. Value of system, $4,060. **Rates:** Domestic, 2·25 to 4·5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·9 cent to 9 cents per k.w.h.; power rate, 0·15 cent to 3·6 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $12 per lamp per year.

WELLAND, Welland Co. (8,825†). Supplied under municipal control and by Welland Electric Co.

Municipal System—Energy obtained from Niagara system of Hydro-Electric Power Commission; amount taken, 2,500 h.p. for distribution system and 3,500 h.p. for special industrial purposes at $14 per h.p.-year at 46,000 volts. **Substation:** Two 1,500-k.w. transformers step voltage down from 46,000 v. to 2,200 v., 3 ph., 25 cy. Earnings divided, 13 per cent lighting, 83 per cent power and 4 per cent miscellaneous. Load factor, 90 per cent. **Distribution:** 35 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 16 line transformers, of 280 k.w. total capacity. Number of consumers, 700; connected load, 825 h.p. lighting and 3,500 h.p. motors. Value of system, $155,750, of which $65,800 is for substation. **Rates:** Domestic, 1 cent to 2 cents per k.w.h. plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·15 cent to 5 cents per k.w.h; power, 0·147 cent to 1·73 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional 25 per cent for power. Street lighting: 100-w. tungsten and 200-w. nitro lamps, at $9 and $18 per lamp per year, respectively.

Welland Electric Co.—Supplied from Dominion Power and Transmission Co. (see under Hamilton). Amount taken, 200 h.p. Output divided, 75 per cent lighting and 25 per cent power. System also includes Fonthill, Fenwick and Ridgeville. **Distribution:** Including all systems, 16 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. to 440 v.; 150 line transformers, of 1,100 k.w. total capacity. Number of consumers, 2,500; connected load, 1,500 k.w. for lighting, 125 h.p. in motors and 400 k.w. in appliances. **Rates:** Domestic, 4 cents net per k.w.h. in Welland and 6 cents net per k.w.h. outside. Flat rate for power, $15 per h.p.-year. Street lighting for outside places: 100-w. tungsten lamps, at $8 per lamp per year.

WELLESLEY, Waterloo Co. (583†). Supplied, under municipal control, from the Baden substation (see under Baden) on the Niagara system of the Hydro-Electric Power Commission. Amount taken, 135 h.p. at $39.96 per h.p.-year. **Distribution:** 3¼ mi. of streets; 10 line transformers, of 110 k.v.a. total capacity. Connected load, 50 h.p. for lighting and 165 h.p. in motors. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power rate, 0·15 to 3·9 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $15 per lamp per year.

WELLINGTON, Prince Edward Co. (829*). Supplied by producer-gas plant of W. P. Niles. **Power Plant:** Concrete and steel building, 33 x 69 ft., containing one 75-h.p. gas producer and engine, the latter belted to a 45-k.w., d.c. generator, at 250 v. and 500 v. Fuel: 200 tons of pea coal per year, at $8 per ton. Night service only. Value of plant $16,000. Installed in 1906. **Distribution:** 2 mi. of streets; system at 250 v., d.c. Number of consumers, 90; connected load, 20 k.w. for lighting and 70 h.p. in motors, latter used in own mill. Value of distribution system, $4,000. **Rates:** Flat rate, 36 to 44 cents per 16-c.p., and 50 to 60 cents per 40-w. lamp per month according to uses. Street lighting: 60-w. and 100-w. tungsten lamps, at $9.40 per 60-w. lamp per year.

WEST HAMILTON, Wentworth Co. Supplied from the Dundas system. See under Dundas.

WEST LORNE, Elgin Co. (708*). Supplied, under municipal control, from Niagara system of Hydro-Electric Power Commission, at $55.50 per h.p.-year. **Substation:** Three 75-k.w. transformers step voltage from 13,200 v. to 4,000 v., 3 ph., 25 cy. **Distribution:** 5 mi. of streets; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 5 line transformers, of 20 k.w. total capacity. Number of consumers, 101; connected load, 50 k.w., all for lighting. Value of system, $8,000. **Rates:** Domestic, 7 cents per k.w.h.; commercial, 14 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $16.50 per lamp per year.

WESTON, York Co. (2,283*). Supplied, under municipal control, from the Niagara system of the Hydro-Electric Power Commission; amount taken, 700 h.p., at $30 per h.p.-year at 13,200 v. **Substation:** Three 100-k.v.a. and three 150-k.v.a. transformers step voltage from 13,200 v. to 2,200 v. and 550 v., 3 ph., 25 cy. Load divided, 24 per cent for lighting and 76 per cent for power. **Distribution:** 8 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 60 line transformers, of 971 k.w. total capacity. Number of consumers, 600; connected load, 585 h.p. for lighting and 1,007 h.p. in motors. Value of system, including substation, $43,826. **Rates:** Domestic, 1·25 to 2·5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·5 cent to 5 cents per k.w.h.; power rate, 0·15 cent to 2·3 cents per k.w.h., plus a monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional 10 to 33⅓ per cent for power, according to restriction in use. Street lighting: 100-w. lamps, at $8 to $11 per lamp per year.

WESTPORT, Leeds Co. (786*). Supplied from hydro-electric plant of J. H. Stoness, on West Rideau river. **Hydro-Electric Plant:** Stone and concrete dam, 100 ft. long and 19 ft. high; plant installed in portion of stone and brick grist mill. Head, 29 ft. Equipment: one 286-h.p. turbine, belted to a 200-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 60 k.w. Night service only. Value of plant, $40,000. Installed in 1916. **Distribution:** 3 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 14 line transformers, of from 2½ k.w. to 5 k.w. capacity. Number of consumers, 125. Value of distribution system, $2,000. **Rates:** Flat rate, 1¼ cents per 40-w. lamp per night. Street lighting: 100-w. tungsten lamps, at 3 cents per lamp per night.

WEST TORONTO, York Co. (part of Toronto). Supplied by Toronto Suburban Railway Co., 1,000 k.w. being purchased from Toronto Power Co. at ·5 cent per k.w.h., plus a fixed charge of $1.25 per h.p. per month at 13,000 volts. **Substation:** Two 400-k.w., 3-ph. transformers step voltage down from 13,000 v. to 2,200 v. at 25 cy., also one 1,000-k.w. and one 300-k.w. rotary converter for electric railway purposes. Output divided, 55 per cent for lighting and power and 45 per cent for electric railway. **Distribution:** Including Mt. Dennis, Thistletown, a portion of York county and the Dundas district east of the Humber river, 19½ mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 130 line transformers, of from ½ k.w. to 75 k.w., with 900 k.w. total capacity. Number of consumers, 978; connected load, 450 k.w. for lighting and 451 k.w. in motors. Value of system, approximately $60,000. **Rates:** Lighting, from 1·5 to 3 cents per k.w.h., according to consumption; power, fixed charge of $1 to $1.35 per h.p. per month, plus 1·5 cents per k.w.h. All rates subject to 10 per cent discount.

WHEATLEY, Kent Co. (605*). Supplied from gas-engine plant of Marven White. **Power Plant:** Concrete building, 24 x 50 ft. Equipment: one 35-h.p. and one 16-h.p. gas-engine, belted, respectively, to an 18 k.w. and a 7½ k.w., d.c. generator at 125 v. Fuel: natural gas, 100,000 cu. ft. per month, at 25 cents per 1,000. Maximum demand, 20 k.w. for lighting only. Value of plant, $10,000. Night service only. Installed in 1912. **Distribution:** 2 mi. of streets; system at 125 v., d.c. Number of consumers, 100; connected load, 20 k.w. for lighting. Value of distribution system, $3,000. **Rates:** Flat rate, 1 cent per watt per month. Street lighting: 100-w. tungsten lamps, at $12 per lamp per year.

WHITBY, Ontario Co. (2,902*). Supplied, under municipal control, from the Oshawa substation of the Central Ontario system of the Hydro-Electric Power Commission; amount

taken, 300 h.p. **Distribution:** 20 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 40 line transformers, of from 1 k.w. to 20 k.w. capacity. Number of consumers, 554; connected load, 500 k.w. for lighting and 225 k.w. in motors. Distribution system valued at $18,484. **Rates:** Domestic lighting rate, from 2 to 3 cents per k.w.h., plus 3 cents per 100 sq. ft. of area per month; commercial, from 2 to 8 cents per k.w.h.; flat rate for power, from $25 to $39.96 per h.p.-year, or a meter rate of from 0·6 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p., or a straight meter rate of from 3 to 6 cents per k.w.h. All rates are subject to 20 per cent discount. Street lighting: 60-c.p. and 100-w. lamps, at $10 per lamp per year.

WIARTON, Bruce Co. (1,728*). Supplied by hydro-electric plant of Sauble Falls Light and Power Co. Situated on Sauble river. **Hydro-electric Plant:** Concrete dam, 110 ft. long and 3 ft. high, with a 7-ft. concrete flume leading to concrete power house, 17 x 27 ft. Equipment: one 250-h.p. turbine, direct connected to a 200-k.w., 3-ph., 60-cy., 6,600-v. generator. Maximum load, 140 k.w. Continuous service. Value of plant, $20,235. Installed 1907. **Transmission Line:** From plant to Wiarton, 7 mi.; operates at 6,600 v., 3 ph., 60 cy. Line consists of single circuit of three No. 6 copper conductors, with pin-type insulators on wooden poles. Can transmit 180 h.p. with 6 per cent loss. **Substation:** Three 70-k.w. transformers step voltage from 6,600 v. to 1,100 v. **Distribution:** 8 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 26 line transformers, of from 2 k.w. to 20 k.w. capacity. Number of consumers, 175; connected load, 120 k.w. for lighting and 60 h.p. in motors. Value of system, $5,000. **Rates:** Flat rate, 25 cents per 16-c.p. or 40-w. lamp per month; meter rate, from 2 to 10 cents per k.w.h. Street lighting: arc and 100-w. nitrogen lamps, at $50 and $12.50 per lamp per year, respectively.

WILLIAMSBURG, Dundas Co. Supplied, under municipal control, through Hydro-Electric Power Commission from the Morrisburg municipal hydro-electric plant. (See under Morrisburg.) Amount taken, 30 h.p., at $30 per h.p.-year at 2,200 v. Earnings divided, 77 per cent for lighting and 23 per cent for power. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 4 line transformers, of 30 k.w. total capacity. Number of consumers, 51; connected load, 25 k.w. for lighting and 15 h.p. in motors. Value of system, $2,274. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power rate, 0·3 cent to 4·2 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $13 per lamp per year.

WINCHESTER, Dundas Co. (1,042*). Supplied, under municipal control, from St. Lawrence system of Hydro-Electric Power Commission; amount taken, 67 h.p., at $43 per h.p.-year at 2,300 v. **Substation:** Three 50-k.v.a. transformers step voltage from 26,400 v. to 4,000 v. and 2,200 v., 3 ph., 60 cy. Earnings divided, 94 per cent lighting, 5 per cent power and 1 per cent miscellaneous. **Distribution:** 6 mi. of streets; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 220 v.; 10 line transformers, of 90 k.w. total capacity. Number of consumers, 200; connected load, 150 k.w. for lighting and 35 h.p. in motors. Value of system, $11,392. **Rates:** Domestic, 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·8 cent to 8 cents per k.w.h.; power, 0·25 cent to 3·1 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount: Street lighting: 100-w. tungsten lamps, at $15 per lamp per year.

WINDSOR, Essex Co. (28,064†). Supplied under municipal control and by Sandwich, Windsor and Amherstburg Ry. Co.

Municipal System—Energy obtained from Niagara system of Hydro-Electric Power Commission. System also includes Sandwich. Amount taken, 2,000 h.p., at $38 per h.p.-year at 26,400 v. **Substation:** Three 750-k.w. transformers step voltage from 26,400 v. to 4,000 v. and 2,200 v., 3 ph., 25 cy. Load divided, 72 per cent for lighting and 28 per cent

for power; load factor, 42 per cent. **Distribution:** 45 mi. of streets, with large portion of street lighting system underground; primaries at 4,000 v. and 2,200 v. and secondaries at 110 v. to 550 v. Line transformers valued at $15,567. Number of consumers, 4,000; connected load, 3,945 h.p. for lighting, 1,050 h.p. in motors. System valued at $438,400, of which $35,570 is for substation. **Rates:** Domestic, 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·8 cent to 8 cents per k.w.h.; power, 0·15 cent to 3·6 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. and 500-w. nitro lamps, at $12 and $50 per lamp per year, respectively.

Sandwich, Windsor and Amherstburg Railway.—Obtained from steam-power plant, the system including Windsor and Sandwich. **Steam Plant:** Located in Windsor, steam being purchased from Canadian Salt Co. Concrete block building, 50 x 100 ft., containing two 750-h.p. engines, each direct connected to a 550-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum demand, 800 h.p. Output divided, 62 per cent lighting and 38 per cent power; load factor, 80 per cent. Cost of generation, 1 cent per k.w.h. Continuous service. Installed 1911. Value $75,000. There is a tie line between this plant and that of the Hydro-Electric Power Commission (Essex County Light and Power Co.) in Sandwich. **Distribution:** 50 mi. of streets, including Sandwich; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 189 line transformers, ranging from 2 k.w. to 75 k.w. Number of consumers, 2,250. **Rates:** Domestic, from 2 to 8 cents per k.w.h.; commercial, 0·8 cent to 8 cents per k.w.h.; power, 0·3 cent to 3·6 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount.

WINGHAM, Huron, Co. (2,474*). Supplied, under municipal control, from combined hydro-electric and steam plant. **Power Plant:** Concrete dam, 200 ft. long and 12 ft. high and up to 15 ft. with flashboards. Excavated open headrace, 24 ft. wide, 8 ft. deep and 1,000 ft. long, leading to a brick power house, 30 x 60 ft. Hydraulic equipment: two 100-h.p. turbines, belted through countershaft to a 150-k.w., 3-ph., 60-cy., 2,200-v. generator. Steam plant equipment: Two 100-h.p. fire-tube boilers, at 120 lbs. pressure, one 250-h.p. engine, direct connected to an 187-k.w. generator, and one 100-h.p. engine, belted through countershaft to a 150-k.w. generator. All energy at 3 ph., 60 cy., 2,200 v. Steam plant only operated as auxiliary during portion of the year. Maximum load, 200 h.p. Output divided, 60 per cent for lighting and 40 per cent in power. Continuous service. Installed 1903. Valued at $55,000, including distribution system. **Distribution:** 14 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 40 line transformers, of 400 k.w. total capacity. Number of consumers, 450; connected load, 250 k.w. for lighting, 150 h.p. in motors and 160 k.w. in appliances. **Rates:** Lighting meter rate, 8 cents per k.w.h. net, with a meter rental; lighting flat rate, $4 per lamp per year; power meter rate, 2 to 3 cents per k.w.h., with a monthly minimum; power flat rate, $40 per h.p.-year. Street lighting: 100-c.p. and 250-c.p. lamps, at $20 and $60 per lamp per year.

WINONA, Wentworth Co. Supplied by the Dominion Power and Transmission Co. (see under Hamilton). Distribution system also includes Stony Creek and Saltfleet township. **Distribution:** 8 mi. of streets; primaries at 2,400 v. and secondaries at 110 v. to 550 v.; 73 line transformers, of from ·6 k.w. to 15 k.w. capacity.

WOODBRIDGE, York Co. (615*). Supplied from Niagara system of Hydro-Electric Power Commission; amount taken, 80 h.p., at $33.83 per h.p.-year at 4,000 v. **Substation:** Three 75-k.w. transformers step voltage from 13,200 v. to 4,000 v. at 3 ph., 25 cy. Earnings divided, 48 per cent for lighting and 52 per cent for power. **Distribution:** Approximately 4 mi. of streets and roads; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; line transformers of a total value of $1,945. Number of consumers, 98; connected load, 103 h.p. for lighting and 95 h.p. in motors. Value of system, $9,714. **Rates:** Domestic, 2 to 4 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·8 cent to 8 cents per k.w.h.;

power, ·15 cent to 3·6 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $13 per lamp per year.

WOODSTOCK, Oxford Co. (10,027†). Supplied, under municipal control, from Niagara system of Hydro-Electric Power Commission; amount taken, 1,200 h.p., at $21 per h.p.-year at 13,200 v. A municipal steam plant is available in emergencies. **Substation:** Contained in steam plant building; four 350-k.w. transformers step voltage from 13,200 v. to 2,300 v. Output divided, 36 per cent for lighting and 64 per cent for power. Load factor, 70 per cent. **Steam Plant:** Brick building, 100 x 35 ft., containing two 220-h.p. water-tube boilers, at 120 lbs. pressure, and two 220-h.p. compound condensing engines, each belted to a 200-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal, at $7 per ton. **Distribution:** 36 mi. of streets, with ¼ mi. underground; primaries at 2,200 v. and secondaries at 110 v. and 550 v.; 150 line transformers, of 1,800 k.w. total capacity. Number of consumers, 1,816; connected load, 2,067 h.p. for lighting and 2,130 h.p. in motors. Value of system, $160,792, of which $27,685 is for substation, and $31,689 for steam plant. **Rates:** Domestic, 1 cent to 2 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 0·4 to 4 cents per k.w.h.; power, 0·173 cent to 2·133 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount, with additional 25 per cent for power. Street lighting: 250-c.p. nitro lamps, at $24, and 60-w. to 100-w. nitro lamps, at $9 per lamp per year.

WOODVILLE, Victoria Co. (357*). Supplied, under municipal control, from the Cannington substation on the Wasdell system of Hydro-Electric Power Commission; amount taken, 48 h.p., at $50 per h.p.-year at 4,000 v. Earnings divided, 54 per cent for lighting and 46 per cent for power. **Distribution:** 2½ mi. of streets; 10 line transformers, of 66 k.w. total capacity. Number of consumers, 68; connected load for power alone, 50 h.p. Value of system, $5,498. **Rates:** Domestic, 3 to 6 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1·2 to 12 cents per k.w.h.; power, 0·4 cent to 4·5 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. lamps, at $13 per lamp per year.

WROXETER, Huron Co. (349*). Supplied from municipal combined hydro-electric and steam plant on Maitland river in the village. **Power Plant:** Earth dam, 600 ft. long, with a wooden flume, 234 ft. long, of 6 x 10 ft. section, leading to power house, 30 x 20 ft. Head, 10 ft. Hydraulic equipment: one 60-h.p. water wheel, also used for grist mill, belted to a 50-k.w., single-ph., 133-cy., 1,100-v. generator. Steam plant equipment: one 50-h.p. boiler and one 40-h.p. engine. Steam plant only used as an auxiliary during water shortage. Fuel: wood and bituminous coal. Maximum load, 14 k.w. Night service only. Installed 1909. **Distribution:** Number of consumers, 60. **Rates:** 12 cents per k.w.h. Street lighting: 32-c.p. lamps.

WYOMING, Lambton Co. (526*). Supplied, under municipal control, from the Petrolia substation on the Niagara system of Hydro-Electric Power Commission; amount taken, 30 h.p., at $38.34 per h.p.-year at 4,000 v. Service entirely for lighting. **Distribution:** 8 mi. of streets, including supply line from Petrolia; primaries at 4,000 v. and secondaries at 110 v. and 220 v.; 5 line transformers, of 27 k.w. total capacity. Number of consumers, 90; connected load, 110 h.p. for lighting. Value of system, $7,000. **Rates:** Domestic, 2·5 to 5 cents per k.w.h., plus 3 cents per 100 sq. ft. floor area per month; commercial, 1 cent to 10 cents per k.w.h.; power, 0·15 cent to 4·2 cents per k.w.h., plus monthly fixed charge of $1 per h.p. All rates subject to 10 per cent discount. Street lighting: 100-w. tungsten lamps, at $16 per lamp per year.

YARKER, Lennox and Addington Co. Supplied by Benjamin Wheel Co., from a water-power plant in connection with factory. **Power Plant:** Equipment installed in mill situated

on Napanee river. Head utilized, 26 ft. Equipment: mill turbines also operate a 12½-k.w., 125-v., d.c. generator. **Distribution:** Outside system confined to a few residences, supplied on flat rate.

YORK MILLS, York Co. Supplied by Toronto and York Radial Railway Co. (See under Aurora.)

ZURICH, Huron Co. (500†). Supplied, under municipal control, from Exeter substation on Niagara system of Hydro-Electric Power Commission; amount taken, 50 h.p. **Distribution:** 1½ mi. of streets; primaries at 4,000 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 70 k.v.a. total capacity; connected load, 20 h.p. for lighting and 50 h.p. in motors. **Rates:** Domestic, 8 cents per k.w.h., plus 3 cents per 100 sq. ft. area per month; commercial, 16 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $20 per lamp per year.

MANITOBA

ASSINIBOIA, municipality of. Supplied by Winnipeg Electric Railway Co. (See under Winnipeg). **Distribution:** 31 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. and 550 v.; 115 distribution transformers, ranging from 1 to 200 k.w. capacity. Number of consumers, 2,700. Value of system, $217,055. **Rates:** Same as Winnipeg. Street lighting: 6.6-amp., d.c. luminous arc lamps, at $73 per lamp per year.

BEAUSEJOUR (879). Supplied under municipal control, 20 k.w. being purchased from the Winnipeg municipal system. (See Winnipeg). **Substation:** Two 15-k.w. transformers step voltage from 12,000 v. to 2,200 v. **Distribution:** 1½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 4 line transformers. Number of consumers, 50; connected load, 25 k.w. for lighting only. Value of system, $6,500. **Rates:** 15 cents per k.w.h., less 10 per cent discount. Street lighting: 400-c.p. lamps, at $46 per lamp per year.

BOISSEVAIN (948). Supplied from municipal steam plant. **Steam Plant:** Metal-covered frame building, 30 x 60 ft., containing two 60-h.p. return tubular boilers, at 90 lbs. pressure, and one 75-h.p. engine, direct connected to a 75-k.w., 2-ph., 60-cy., 2,200-v. generator. Fuel: Miller Creek screenings and United States steam coal; consumption, 450 tons per year, at $6.88 per ton. Maximum load, 75 h.p. Night service only. Installed 1909. Value of plant, $21,305, including distribution system. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 115 v.; 20 line transformers, of 113 k.w. total capacity. Number of consumers, 130. **Rates:** 15 cents per k.w.h. Street lighting: 250-w. nitro and 32-c.p. lamps, at 15 cents per k.w.h.

BRANDON (15,215). Supplied by Canada Gas and Electric Corporation, from a steam plant in the city and a hydro-electric plant on Minnedosa river near mouth, 10½ mi. distant. Company also has extensive central steam-heating system. **Steam Plant:** Brick building, 200 x 125 ft., including offices. Equipment: thirteen 150-h.p. return tubular and two 250-h.p. water tube boilers at 150 lbs. pressure; one 2,250-h.p. and two 478-h.p. compound Corliss engines, direct connected, respectively, to one 1,200-k.w. and two 300-k.w., 3-ph., 60 cy., 2,300-v. generators; two 200-h.p. motor-generator units, one direct connected and the other belted, supply d.c. energy at 125 v. and 250 v. Two 300 k.w. motor-generators, owned by city, supply d.c. energy for electric railway. Six 100-k.w. station transformers, for energy received from hydro-electric plant, step voltage from 11,000 v. to 2,300 v., at 3 ph., 60 cy. Maximum load, 1,550 k.w., divided 50 per cent for lighting, 25 per cent for power and 25 per cent for electric railway. Fuel: 9,113 tons of bituminous and 7,315 tons of lignite coal per year at $10.90 and $3.45 per ton, respectively (1918). Continuous service. Cost of generation, including overhead charges, 5·13 cents per k.w.h. First installation, 1889. **Hydro-Electric Plant:** Stone-filled crib dam, 260 ft. long and 40 ft. high, with adjacent frame power house. Head utilized, 30 ft., dam affording a local storage reservoir of 400 acres. Equipment: two 500-h.p. turbines, geared and belted to two 300-k.w., 3-ph., 60-cy., 1,150-v. generators. Six 100-k.w. station transformers, stepping voltage from 1,150 v. to 11,000 v. at 3 ph., 60 cy. Plant used as auxiliary to steam when water is available and maximum load adjusted to conditions. It is usually operated between the months of April and November. Value of plant, $101,868. Installed 1900. **Transmission Line:** Extends from hydro-electric plant to Brandon; operates at 11,000 v., being 10½ mi. in length, and consisting of a single circuit of three No. 6 copper conductors on pin-type insulators and wooden poles. Protected by gap arresters. Value, including station transformers, $31,000. **Distribution:** 38 mi. of streets;

See page 12 for explanation of abbreviations used in this report.

NOTE—Statistics of population extracted from the Census of 1916.

primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 299 line transformers, of 2,465 k.w. total capacity. Number of consumers, 2,261; connected load in motors alone, including electric railway, 1,303 h.p., and, in appliances, 500 k.w. Value of distribution system, $210,000. **Rates:** Lighting, 10 cents per k.w.h., less 5 per cent discount, with monthly minimum and meter rental; power meter rate, 10 cents per k.w.h., less 5 to 50 per cent discount, according to consumption, with a meter rental and monthly minimum; power flat rate, $60 to $65 per h.p.-year, according to restrictions. Street lighting: 25-w., 100-w. and 300-w. lamps, at 5 cents per k.w.h. **Steam Heating System:** 7,962 ft. of 3 in. to 18 in. mains, supplying 144 consumers. Steam supplied from exhaust supplemented by live steam and sold at the rate of 83 cents to $1.75 per 1,000 lbs. steam at 1 to 3 lbs. pressure. Value of steam distribution system, $124,000.

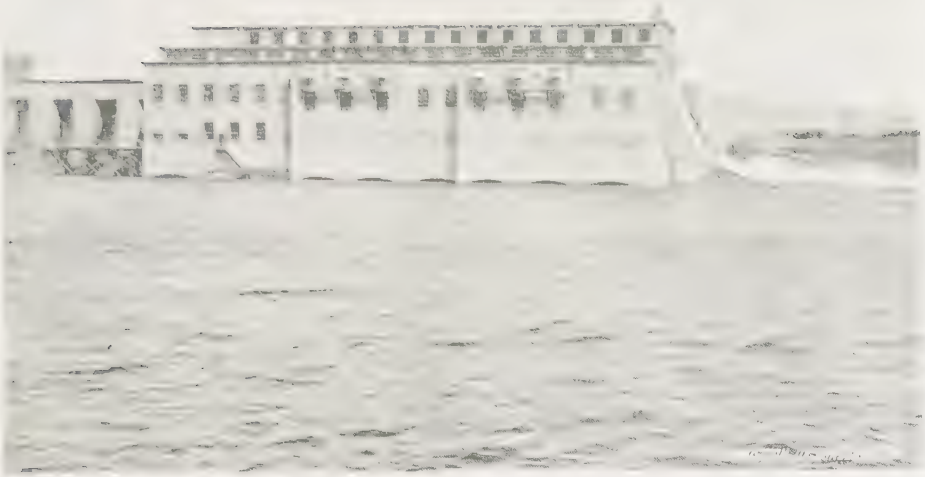
CARBERRY (931). Supplied from municipal steam plant. **Steam Plant:** Brick building, 42 x 82 ft., containing two 125-h.p. return tubular boilers, at 110 lbs. pressure, and one 95-h.p. engine, direct connected to a 75-k.w., 2-ph., 60-cy., 2,200-v. generator. Fuel: lignite coal; consumption, 850 tons per year, at $3.60. Maximum demand, 35 k.w. Night service only. Value of plant, including distribution system, $40,000. Installed 1906. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 12 line transformers, of from 2 k.w. to 15 k.w. capacity. Number of consumers, 155; connected load, 78 k.w. in lighting and 25 k.w. in appliances. **Rates:** 17 cents per k.w.h., less 10 per cent discount. Street lighting: enclosed arc lamps, at $80 per lamp per year.

CARMAN (1,426). Supplied from municipal steam plant. **Steam Plant:** Frame building, 38 x 94 ft., containing one 80-h.p. and one 100-h.p. return tubular boiler; one 75-h.p. and one 100-h.p. engine, direct connected, respectively, to a 38-k.w. and a 50-k.w., 250-v., d.c. generator. Fuel, Elkhorn screenings: consumption, 410 tons a year, at $6.45 per ton. Maximum load, 60 k.w. Night service only. Value of plant, $24,000, including distribution system. Cost of generation, 14 cents per k.w.h. Installed 1901. **Distribution:** 4½ mi. of streets; system at 220 v., d.c. Number of consumers, 151; connected load, 68 k.w. **Rates:** 16 cents per k.w.h. Street lighting: 100-w. tungsten and 500-w. nitro lamps, at 16 cents per k.w.h.

DAUPHIN (3,200). Supplied from municipal steam plant. **Steam Plant:** Brick building, 45 x 75 ft., containing four 100-h.p. return tubular boilers at 125 lbs. pressure, two compound engines of 150 h.p. and 287 h.p. and one simple engine of 100 h.p., direct connected, respectively, to one 100-k.w., one 225-k.w. and one 65-k.w. generator; energy at 2 ph., 60 cy., 2,200 v. Fuel: soft wood; yearly consumption, 3,000 cords, at $3.90 per cord. Maximum load, 140 k.w.; output divided, 55 per cent for lighting and 45 per cent for power. Continuous service. Value of plant, $42,757. Cost of generation, 5¼ cents per k.w.h. Installed 1905. **Distribution:** 11¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 55 line transformers, of from 2 to 15 k.w. capacity. Number of consumers, 595; connected load, 350 k.w. for lighting and 232 h.p. in motors. Value of system, $20,075. **Rates:** Lighting, 20 cents per k.w.h., less 40 per cent discount. Power, 8 cents per k.w.h., less discounts varying with consumption. Street lighting: enclosed arc and 80-c.p. incandescent lamps, at $150 and $36 per lamp per year, respectively.

FORT GARRY. Supplied by Winnipeg Electric Railway Co. (See under Winnipeg). Number of consumers, 112. **Rates:** Lighting, 5 cents per k.w.h; fuel and power, 3 cents per k.w.h. All with monthly minimum.

KILLARNEY (989). Supplied from steam plant of Killarney Electric Light Co. **Steam Plant:** Metal-covered frame building, 40 x 35 ft., containing two 100-h.p. return tubular boilers at 100 lbs. pressure and one 100-h.p. engine, belted to a 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: lignite coal, 800 tons per year at $3 per ton. Maximum demand, 50 k.w. Night service only. Value of plant, $11,000. Cost of generation, 11 cents per k.w.h.



WINNIPEG MUNICIPAL ELECTRIC SYSTEM—HYDRO-ELECTRIC PLANT AT POINT DU BOIS, WINNIPEG RIVER, 78 MILES NORTHEAST OF WINNIPEG, MAN.

WINNIPEG ELECTRIC RAILWAY CO.—HYDRO-ELECTRIC PLANT ON PINAWA CHANNEL OF WINNIPEG RIVER, 60 MILES NORTHEAST OF WINNIPEG, MAN.

Installed 1908. **Distribution:** 3½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 7 line transformers, of from 1 to 10 k.w. capacity. Number of consumers, 140; connected load, 80 k.w. Value of system. $3,000. **Rates:** 17 cents per k.w.h. Street lighting: 100-w. nitro lamps and 60-w. tungsten lamps, at $45 and $33 per lamp per year, respectively.

MELITA (834). Supplied under municipal control; energy obtained in block from the Melita Flour Milling Co. at 8 cents per k.w.h. **Steam Plant:** Steam supplied from mill boilers. Equipment, one 60-h.p. engine, direct connected to a 38-k.w., 110-v., d.c. generator. Night service only. Installed in 1918. **Distribution:** 1½ mi. of streets, at 110 v., d.c. Number of consumers, 100; connected load, 40 k.w. for lighting and 15 k.w. in appliances. Value of distribution system, $11,000. **Rates:** 15 cents per k.w.h., with monthly minimum. Street lighting: 100-w. lamps, at 8 cents per k.w.h.

MINNEDOSA (1,833). Supplied by hydro-electric plant of Minnedosa Power Co. **Hydro-electric Plant:** Earth-filled dam, 1,650 ft. long and 20 ft. high. A 6-ft. wood-stave pipe, 400 ft. long, leads to frame power house on concrete foundation, 30 x 40 ft. Head utilized varies from 24 ft. to 14 ft. Equipment: one 450-h.p. turbine, direct connected to a 300-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 65 k.w., divided, 93 per cent for lighting and 7 per cent for power. Principal trouble from shortage of water in winter. Continuous service when sufficient water, night service only otherwise. Value of plant, $163,000. In operation since 1914. **Distribution:** 8½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 12 line transformers, of from 5 to 15 k.w. capacity. Number of consumers, 290; connected load, 120 k.w. for lighting, 10 k.w. in motors and 10 k.w. in appliances. Value of system, $6,500. **Rates:** Lighting, 20 cents per k.w.h., less 40 per cent discount; power, 5 cents per k.w.h.; appliances, 2 cents per k.w.h. Street lighting: 100-w. and 250-w. lamps, at $15 and $30 per lamp per year, respectively.

MORDEN (1,261). Supplied from municipal steam plant. **Steam Plant:** Metal-covered frame building, 60 x 33 ft., containing two 80-h.p. return tubular boilers at 110 lbs. pressure, one 100-h.p. compound and one 50-h.p. engine, belted, respectively, to a 50-k.w. and a 25-k.w., single-ph., 133-cy., 1,100-v. generator. Fuel: Pocahontas screenings; consumption, 360 tons per year, at $6.75 per ton. Maximum demand, 35 k.w. Night service only. Value of plant, $5,000. Cost of generation, 12 cents per k.w.h. Installed 1890. **Distribution:** 6 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 16 line transformers, of from 1 to 4½ k.w. capacity. Number of consumers, 200; connected load, 60 k.w. for lighting. Value of system, $10,000. **Rates:** 16 cents per k.w.h. Street lighting: 100-w. nitro and 150-w. tungsten lamps, at $20 per 100-w. per year.

NEEPAWA (1,854). Supplied from municipal steam plant. **Steam Plant:** Frame building, containing two 150-h.p. return tubular boilers, at 130 lbs. pressure, and one 188-h.p. compound engine, direct connected to a 150-k.v.a. generator and a 105-h.p. compound engine, belted to a 100-k.v.a. generator. Energy at 3 ph., 60 cy., 2,300 v. Fuel: Souris lignite coal; consumption, 1,837 tons per year at $4.25 per ton. Maximum demand, 135 k.w., with a load factor of 20 per cent. Practically continuous service. Value of plant, $36,000. Cost of generation, 8 cents per k.w.h. Installed 1900. **Distribution:** 4 mi. of streets; primaries at 2,300 v. and secondaries at 115 v. to 230 v.; 40 line transformers, ranging from 0·6 to 50 k.w. Number of consumers, 300. Value of distribution system, $8,000. **Rates:** Lighting, 15 cents per k.w.h.; appliances, 4 cents per k.w.h.; power, 4 to 9 cents per k.w.h. Street lighting: 250-c.p. nitro lamps, at 15 cents per k.w.h.

PORTAGE LA PRAIRIE (5,879). Supplied from a municipal steam plant. **Steam Plant:** Brick building, 70 x 100 ft., containing four 150-h.p. return tubular boilers at 140 lbs. pressure; two 450-h.p. cross compound engines, each direct connected to a 300-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal screenings, 3,000 tons per year, at $5.65 per ton.

Maximum load, 700 h.p.; average load factor, 30 per cent; output divided, 71 per cent for lighting and 29 per cent for power. Continuous service. Plant valued at $80,000. Cost of generation, 1·8 cents per k.w.h. Installed in 1908. **Distribution:** 15 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 50 line transformers, ranging from 2 to 50 k.w. Number of consumers, 760; connected load, 750 k.w. for lighting and appliances and 400 k.w. in motors. Value of system, $80,000. **Rates:** Lighting, 15 cents per k.w.h. less 5 to 15 per cent discount, according to consumption; power, 10 cents per k.w.h., less discounts up to 75 per cent, according to consumption. Street lighting: 100-c.p. to 400-c.p. lamps, at an average of $30 per lamp per year.

RAPID CITY (658). Supplied from a municipal producer-gas plant. **Power Plant:** Building, 60 x 16 ft., containing a gas producer and a 50-h.p. suction gas engine, belted to a 25-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea anthracite coal; yearly consumption, 75 tons, at $9.50 per ton. Night service only. Value of power plant, $12,000. Installed 1913. **Distribution:** 3½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 12 line transformers, of 40 k.w. total capacity. Number of consumers, 95; connected load, 24 k.w. for lighting. Value of system, $3,500. **Rates:** 15 cents per k.w.h. Street lighting: 50-w. and 100-w. nitro and tungsten lamps, at $21.70 per 100-w. per year.

RESTON (494). Supplied from a municipal gasolene-engine plant. **Power Plant:** Brick building, 28 x 35 ft.; contains two 20-h.p. gasolene engines, operating two 12-k.w., 150-v., d.c. generators. One 340-amp.-hr. storage battery provides for continuous service. Fuel: gasolene, at 33 to 37 cents per gal. Value of plant, $9,135. Installed 1915. **Distribution:** 2 mi. of streets, at 115 v., d.c. Number of consumers, 99. Value of distribution system, $4,243. **Rates:** 20 cents per k.w.h. Street lighting: 100-w. and 200-w. lamps, at $27 per 100-w. per year.

ROCKWOOD. Supplied by Winnipeg Electric Railway Co. (See under Winnipeg). **Substation:** One 20-k.w. transformer steps voltage from 13,200 v. to 2,200 v. **Distribution:** 2¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 3 line transformers, of 14 k.w. total capacity. Number of consumers, see Stonewall. **Rates:** 8 cents per k.w.h., with a monthly minimum.

RUSSELL (820). Supplied from a municipal producer-gas plant. **Power Plant:** Brick veneer building, 20 x 90 ft., containing a gas producer and one 75-h.p. suction gas engine, belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 35 k.w. Fuel: pea anthracite coal; yearly consumption, 130 tons, at $10 per ton. Night service only. Value of plant, $20,000, including distribution. Installed 1913. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 7 line transformers, ranging from 2½ to 10 k.w. Number of consumers, 137. **Rates:** 20 cents per k.w.h. Street lighting: 100-w. lamps, at $36 per lamp per year.

ST. ANDREWS. Supplied by Winnipeg Electric Railway Co. (See under Winnipeg). **Substation:** One 20-k.w. transformer steps voltage from 13,200 v. to 2,200 v. **Distribution:** 11½ mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 17 line transformers, ranging from 2 to 15 k.w. Number of consumers, see under Stonewall. **Rates:** 8 cents per k.w.h., with a monthly minimum.

ST. BONIFACE (11,021). Supplied by Winnipeg Electric Railway Co. (See under Winnipeg).

ST. NORBERT. Supplied by Winnipeg Electric Railway Co. (See under Winnipeg). Number of consumers, 47. **Rates:** Lighting, 7½ cents per k.w.h.; fuel and power, 5 cents per k.w.h., with monthly minimum.

ST. VITAL. Supplied by Winnipeg Electric Railway Co. (See under Winnipeg). Number of consumers, 437. **Rates:** Lighting 3½ to 5 cents per k.w.h., according to location; fuel and power, 3 cents per k.w.h., all with monthly minimum. Street lighting: 6·6-amp. arc lamps, at $73 per lamp per year.

SELKIRK (3,399). Supplied under municipal control. Obtained in block from the Winnipeg Electric Railway Co. (Winnipeg, Selkirk and Lake Winnipeg Railway Co.—see Winnipeg), at $30 per h.p.-year at 2,200 v. Maximum load, 130 k.w.; yearly load factor, 34 per cent; output divided, 65 per cent for lighting and 35 per cent for power. **Distribution:** 13 mi. of streets, primaries at 2,200 v. and secondaries at 110 v.; 52 line transformers, ranging from 2 to 40 k.w. Number of consumers, 506; connected load, 305 k.w. for lighting, 310 k.w. for power and 59 k.w. in appliances. Value of system, $47,000. **Rates:** Domestic lighting, 6 cents per k.w.h.; commercial, 5 cents per k.w.h.; cooking, 1·75 cents per k.w.h.; power, 5 cents per k.w.h. All rates subject to monthly minimum. Street lighting: 80-c.p. tungsten and 300-w. nitro lamps, at 5 cents per k.w.h.

SHOAL LAKE (642). Supplied from a municipal oil-engine plant. **Power Plant:** Brick building, 54 x 24 ft., containing one 2-cylinder, 55-h.p. oil engine, direct connected to a 30-k.w., 110-v. and 220-v., d.c. generator. A 120-cell storage battery provides continuous service. Fuel: kerosene; yearly consumption, 7,021 gal., at 20 cents per gal. Value of plant, including distribution, $28,000. Installed 1915. **Distribution:** 10 mi. of streets and roads, at 110 v. and 220 v., 3 wire, d.c. Number of consumers, 118; connected load in motors alone, 3½ h.p. **Rates:** Lighting, 20 cents per k.w.h.; power, 10 cents per k.w.h. Street lighting: 100-w. and 300-w. lamps, at 10 cents per k.w.h.

SOURIS (1,845). Supplied from a municipal producer-gas plant, also used for waterworks purposes. **Power Plant:** Brick building, 75 x 60 ft., with an extension, 24 x 31 ft. Equipment: one 100-h.p. pressure producer, using lignite coal and two 50-h.p. suction producers for pea anthracite coal, the latter for emergencies only; two 82-h.p. gas engines, belted through countershaft to a 50-k.w. and a 30-k.w. d.c., 250-v. generator; a 120-cell, 125-v. and 250-v. storage battery of 196 amp.-hr. floats on the line, providing continuous service. Maximum load, 67 k.w., of which 80 per cent is for lighting and 20 per cent for power. Fuel: Souris lignite coal; yearly consumption for electric plant only, 218 tons, at $2.50 per ton. Value of plant, exclusive of waterworks, $29,430. Fuel cost for generation, 0·58 cent per k.w.h. Installed 1913. **Distribution:** 9 mi. of streets, with 1,900 ft. underground; system at 110 v. and 220 v., 3 wire, d.c. Number of consumers, 270; connected load in motors alone, 27 h.p. Value of distribution system, $20,200, of which $7,600 for street lighting standards system. **Rates:** Lighting and power, 15 cents per k.w.h., less 20 to 25 per cent discount, according to consumption, with a monthly minimum and meter rental. Street lighting: 60-w. and 100-w. nitro lamps, charges included with other municipal services.

STONY MOUNTAIN. Supplied from Winnipeg municipal system (see under Winnipeg) and by Winnipeg Electric Railway Co.

Winnipeg Electric Railway System—Substation: One 130-k.w. transformer steps voltage from 13,200 v. to 2,200 v. Amount taken, 60 k.w. **Distribution:** 1 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 2 line transformers, of 10 k.w. total capacity. Number of consumers, see Stonewall. **Rates:** 8 cents per k.w.h., with a monthly minimum. Street lighting: incandescent lamps, at 5 cents per k.w.h.

STONEWALL (1,152). Supplied by Winnipeg Electric Railway Co. (See under Winnipeg). **Substation:** Station transformers, of 300 k.w. total capacity, step voltage from 13,200 v. to 2,200 v., 3 ph., 60 cy. Maximum load, 60 k.w. **Distribution:** 4½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 70 k.w. total capacity. Total number of consumers in Stonewall, Stony Mountain, Rockwood, St. Paul, St. Andrews

and Selkirk, 298. **Rates:** Lighting, 8 cents per k.w.h., with a monthly minimum; power, 5 cents per k.w.h. Street lighting: mazda lamps, at $91.20 per lamp per year, and incandescent lamps, at 5 cents per k.w.h.

THE PAS (1,270). Supplied from a municipal oil-engine plant. **Power Plant:** Frame building, 40 x 80 ft., also used for waterworks. Equipment: one 240-h.p. Diesel oil engine, direct connected to a 200-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil, at 12·85c. per gallon. Maximum load, 110 k.w. Night service only. Value of plant, $55,325. Installed in 1914. **Distribution:** 5 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 20 line transformers, of 205 k.w. total capacity. Number of consumers, 284; connected load, 150 k.w. for lighting and 225 h.p. in motors, latter principally for waterworks. **Rates:** Lighting, 11 cents per k.w.h.; power, 9 cents per k.w.h. All rates subject to discounts of from 10 to 15 per cent, according to amount, with a monthly minimum and meter rental. Street lighting: 250-c.p. and 400-c.p. lamps, at $90 per 250-c.p. lamp per year.

TRANSCONA (3,356) Supplied mainly from the Winnipeg municipal system. (See under Winnipeg). Winnipeg Electric Railway Co. also supplies energy, mainly for power.

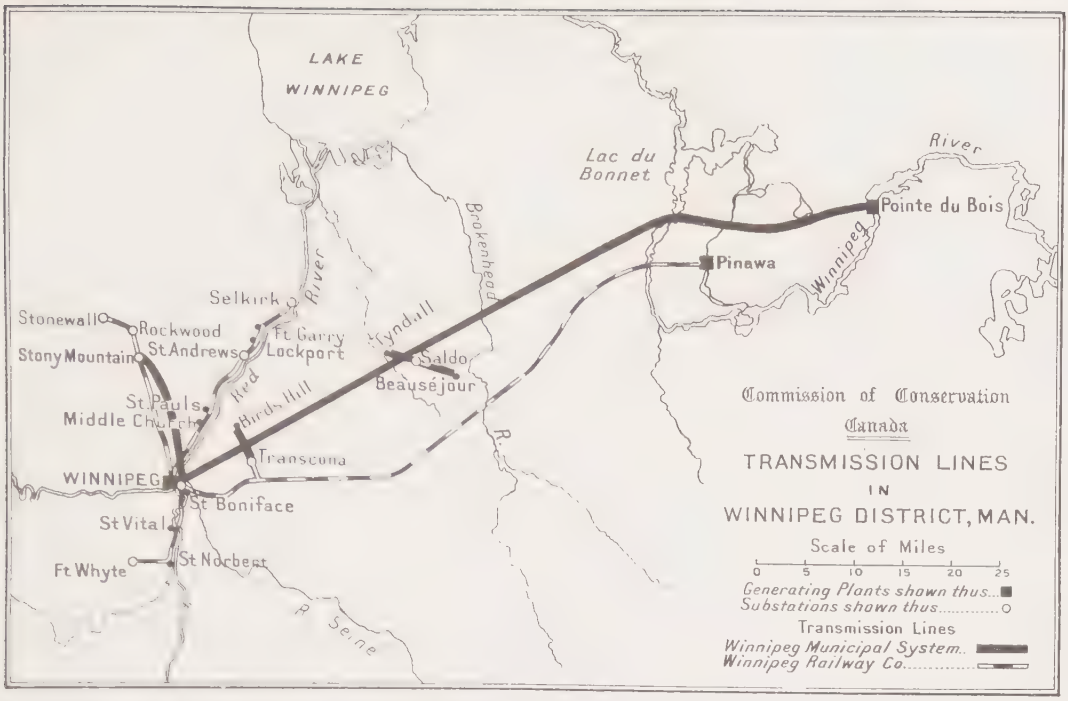
Winnipeg Municipal System—Amount taken, 1,300 k.w. **Substation:** Three 500-k.w. transformers step voltage from 12,000 v. to 2,200 v. at 3 ph., 60 cy. Energy is also supplied in block at 12,000 v. to large power consumers. **Distribution:** 15½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 59 line transformers, of 780 k.w. total capacity. Number of consumers, 641; connected load, 448 k.w. for lighting and 1,078 k.w. for power. Value of distribution system (included under Winnipeg plant), $65,000. **Rates:** Lighting, 4 cents per k.w.h. net, with a monthly minimum; power, from 0·6 cent to 4 cents per k.w.h. net, according to consumption. Street lighting: 1,000-c.p. nitro lamps, at $58.40 per lamp per year.

Winnipeg Electric Railway System—Substation: Six 1,000-k.w. station transformers step voltage down from 55,000 v. to 13,200 v. and 2,300 v., 3 ph., 60 cy.; maximum load, 570 k.w., used for power purposes.

TYNDALL. Quarries supplied from Winnipeg municipal system (see under Winnipeg), from a substation situated at Saldo. Substation also supplies Beauséjour system. **Substation:** Three 300-k.w. transformers step voltage down from 66,000 v. to 12,000 v., at 3 ph., 60 cy. The substation at the quarries includes three 200-k.w. transformers, stepping voltage down from 12,000 v. to 500 v., with a connected load of 600 k.w. and a demand of 400 k.w. Energy is transmitted to Beausejour, 7½ mi. distant, from the Saldo substation at 12,000 v.

WINNIPEG (163,000). Supplied from municipal hydro-electric plant and hydro-electric plant of the Winnipeg Electric Railway Co. The latter has two auxiliary steam plants in the city.

Municipal System—Also distributes in Transcona, Stony Mountain and Bird Hill, supplies Tyndall and city quarries and sells in block to Beauséjour municipal system. **Hydro-electric Plant:** Situated at Point du Bois falls, on the Winnipeg river, 77 mi. north-east of the city. Development includes a dam, 3,100 ft. long and 10 ft. high, partly concrete, partly rock-filled crib; a portion forms a forebay adjacent to concrete power house, 300 x 100 ft., with provision to lengthen it to 500 ft. Dam affords 6,000 acres pondage area. Average head, 46 ft. Equipment: 8 units, including five 5,200-h.p. turbines, each direct connected to a 3,000-k.w. generator, and three 6,800-h.p. turbines, each direct connected to a 5,000-k.w. generator; energy at 3 ph., 60 cy., 6,600 v.; 3 independent exciter units, 2 of these turbine driven, and one motor driven. Six 3,000-k.w. transformers, and one 9,000-k.w., 3-ph. transformer, stepping voltage from 6,600 v. to 66,000 v., 3 ph., 60 cy. Maximum load, 21,000 k.w. Yearly load factor, 44·6 per cent. Cost of generation, $9 per h.p.-year. Continuous service. In operation since 1911. Value, including transmission and distribution system, $7,500,000. **Transmission Line:** From power plant to Winnipeg, 78 mi. long. Operates at 66,000 v.


LAKE
WINNIPEG
Lac du
Bonnet
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Pinawa
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Brokenhead R.
Selkirk
Stonewall
Rockwood
Ft Garry
Stony Mountain
St Andrews
Lockport
Red River
Birds Hill
Kyndall
Saldo
Beausejour
St Pauls
Middle Church
WINNIPEG
Transcona
St Boniface
St Vital
Ft Whyte
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TRANSMISSION LINES
IN
WINNIPEG DISTRICT, MAN.
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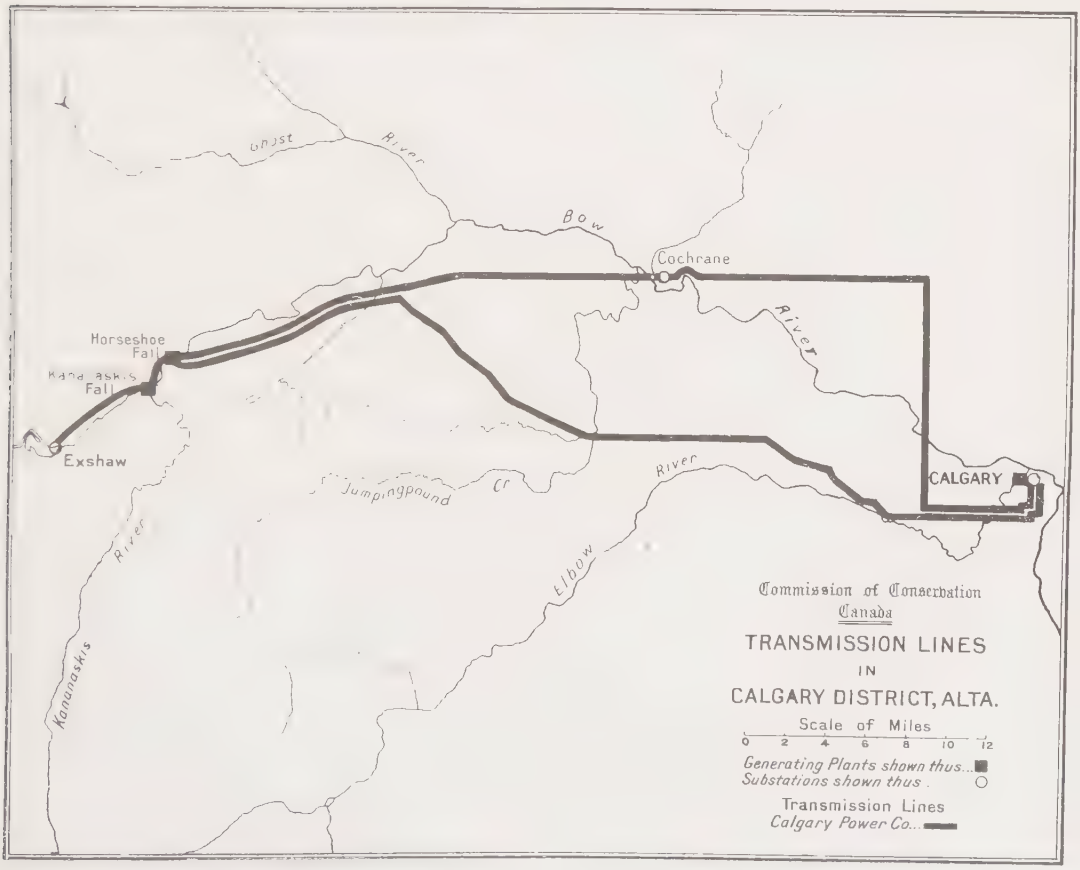
Substations shown thus.....
Transmission Lines
Winnipeg Municipal System..
Winnipeg Railway Co.....


Bow River
Cochrane
Horseshoe Fall
Kananaskis Fall
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Elbow River
CALGARY
Kananaskis River
Commission of Conservation
Canada
TRANSMISSION LINES
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CALGARY DISTRICT, ALTA.
Scale of Miles
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Substations shown thus.
Transmission Lines
Calgary Power Co...

3 ph., 60 cy. Has two circuits of three 278,600 c.m. aluminium conductors on pin-type insulators and steel towers, the latter spaced 600 ft. Capacity of each circuit, 20,000 k.v.a. with 20 per cent loss, using synchronous condensers. Lightning protection, electrolytic arresters. **Substations:** 1 terminal and 4 local substations in city; other substations at Transcona and Saldo and in outlying districts. Terminal station equipment: nine 2,700-k.w. transformers, stepping voltage from 66,000 v. to 12,000 v. for feeders to local substations; two 6,000-k.v.a. synchronous condensers for line regulation, supplied by two 6,300-k.v.a. transformers, stepping voltage from 12,000 v. to 6,600 v. Local stations equipment: station transformers of 15,000 k.w. total capacity, stepping voltage from 12,000 v. to 2,300 v. at 3 ph., 60 cy.; three 500-k.w. motor generators, supplying power service at 250 v. to 500 v., d.c.; also street lighting equipment. **Distribution:** Energy is transmitted at 12,000 v. from terminal station to various local substations, where it is transformed to 2,300 v. Including Winnipeg and vicinity, but not Transcona, 212 mi. of streets, with 7½ mi. underground; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 2,157 distribution transformers, of 20,617 k.w. total capacity, and ranging from 1½ to 500 k.w. Number of consumers, 35,000; connected load, 34,000 k.w. for lighting, 25,000 k.w. for power and 3,500 k.w. in appliances. Value of distribution system (included under power plant), $2,831,786. **Rates:** Lighting, 3⅓ cents per k.w.h., less 10 to 20 per cent discount; power, 0·4 to 3 cents per k.w.h. net. Street lighting: 6·6-amp. magnetite, 7·5-amp. a.c. enclosed arc lamps and 1,000-c.p. nitrogen lamps, at $68, $51.50 and $50 per lamp per year, respectively.

Winnipeg Electric Railway Company's System—System also supplies St. Boniface, Stonewall, Stony Mountain, St. Andrews, Lockport, Transcona, Agricultural College, Canada Cement Co. at Ft. Whyte, Rockwood, St. Paul, Middlechurch, St. Vital, St. Norbert and Ft. Garry. Energy is sold in block for Selkirk municipal system. **Hydro-electric Plant:** On Pinawa channel of Winnipeg river. Development includes a diversion weir, near head of channel, and a concrete dam across the channel; 11 iron penstocks, 80 ft. long, 9 of 14 ft. and 2 of 3½ ft. diameter, lead to brick power house on concrete foundation, 502 x 32 ft. Head utilized, 39 ft. Equipment: 9 units, including four 2,300-h.p. turbines, each direct connected to a 1,500-k.w. generator, and five 4,300-h.p. turbines, each direct connected to a 3,000-k.w. generator; energy at 3 ph., 60 cy., 2,300 v.; 2 independent exciter units. Station transformers of 21,000 k.w. total capacity, in units of 830 k.w. and 1,800 k.w., step the voltage from 2,300 v. to 60,000 v., 3 ph., 60 cy. All equipment has substantial overload capacity. Maximum demand, 23,000 k.w. Load factor, 66·6 per cent. Trouble sometimes experienced from frazil ice in early winter. Continuous service. Valued at $3,055,000. **Transmission Line:** From plant to Winnipeg, 60 mi. in length. Operates at 60,000 v., 3 ph., 60 cy. Consists of 2 circuits of 3 No. 00 copper conductors, with pin-type insulators and steel towers spaced 500 ft. Lightning protection; electrolytic arresters. Substations at Winnipeg and Transcona. **Assiniboine Avenue Steam Plant:** Brick and concrete building 184 x 140 ft., contains 14 water tube boilers of 6,900 h.p. total capacity, in units from 400 to 600 h.p. at 130 lbs. pressure; generating units, all direct connected, one engine of 1,400 h.p., 2 of 1,200 h.p., 3 of 600 h.p. and 2 of 300 h.p., all compound condensing, and two 800-k.w., one 500-k.w., two 200-k.w., 3 ph., 60 cy., 2,200 v., and one 850-k.w., two 400-k.w., 500-v., d.c. generators. Plant only operated as auxiliary at peak load in winter and in emergencies. Fuel: Youghiogheny lump coal, at $9.18 per ton. First installed, 1892, additions since. **Mill Street Steam Plant:** Concrete and brick building, 116 x 121 ft., contains ten 650-h.p. water-tube boilers, at 200 lbs. pressure, and three 3,000-k.w. turbine units; energy at 3 ph., 60 cy., 2,200 v. Plant only operated at peak load in winter and in emergencies. Fuel: Youghiogheny lump coal, at $9.18 per ton, and screenings, at $8.18 per ton. Installed 1911. Value, $970,000. **Substation:** Six 1,800-k.w., six 1,000-k.v.a. and nine 800-k.w. transformers, stepping voltage down from 60,000 v. to 2,200 v. at 3 ph., 60 cy. Motor generator sets for electric railway operation, of 21,700 k.w. total capacity, in units ranging from 850 to 1,500 k.w., supplying 575 v. d.c. energy, and one 5,000-amp.-hr., 600-v. storage battery. Load divided into 28 per cent for lighting, 35 per cent for power and 37 per cent for electric railway. **Distribution:** Including St. Boniface, 500 mi. of streets, with 5 mi. underground; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 1,031 distribution transformers,

ranging from 1 to 100 k.w. Number of consumers, 12,502. Value of distribution system, $1,560,000. **Rates:** Lighting, 3½ cents per k.w.h.; appliances, 3 cents per k.w.h.; power, 3 cents per k.w.h.; less discounts of from 10 to 30 per cent for lighting and appliances and 10 to 50 per cent for power, according to consumption. Street lighting: in St. Boniface, 6·6-amp. arc lamps at from $58.40 to $73 per lamp per year.

WINNIPEG BEACH (240). Supplied principally to hotel from steam plant owned by Canadian Pacific Railway. Operated only in summer. **Power Plant:** one 80-h.p. locomotive-type boiler and one 50-h.p. engine, belted to a 100-k.w., 3-ph., 60-cy., 2,080-v. generator.

SASKATCHEWAN

ARCOLA (852). Supplied from oil-engine plant of Arcola Light and Power Co. **Power Plant:** Brick building, 25 x 42 ft.; contains one 40-h.p. oil engine and one 25-h.p. semi-Diesel oil engine, belted, respectively, to a 60-k.w. and a 30-k.v.a., single-ph., 60-cy., 1,100-v. generator. Fuel: low grade kerosene or distillate; consumption, 6,000 gal. per annum, at from 11¼ to 22 cents per gal. Night service only. Value of plant, $6,000. Installed 1912. **Distribution:** 8 mi. of streets; primaries at 1,100 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 75 k.w. total capacity. Number of consumers, 132; connected load, 30 k.w. for lighting. Value of system, $10,000. **Rates:** 20 cents per k.w.h., less 10 to 20 per cent discount. Street lighting: 100-w. nitro lamps, at $23.60 per lamp per year.

ASSINIBOIA (719). Supplied from a municipal oil-engine plant. **Power Plant:** One 50-h.p. Diesel oil engine, direct connected to a 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil. Night service only. Value including distribution system, $17,000. Installed, 1917. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers. Number of consumers, 100. **Rates:** 15 cents per k.w.h. Street lighting: 1,000-c.p. nitro lamps.

BATTLEFORD (1,436). Supplied under municipal control; obtained in block from the North Battleford system, at 4¼ cents per k.w.h. Load divided, 77 per cent for lighting and 23 per cent for power. **Distribution:** 10 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 28 line transformers, ranging from 3 k.w. to 25 k.w. Number of consumers, 270; connected load, 125 k.w. for lighting and 110 k.w. in motors. Value of system, $12,847. **Rates:** Lighting, 13 to 16 cents per k.w.h., according to consumption. Power, 11 cents per k.w.h. All rates subject to 20 per cent discount. Street lighting: 20 enclosed arc lamps and 38 nitro 100-c.p. lamps, at a total yearly cost of $1,051.

BIG RIVER (697). Supplied by Ladder Lake Lumber Co., from a steam plant operated mainly in connection with mill. **Steam Plant:** Brick building, 80 x 150 ft., contains twelve 125 h.p. Dutch oven tubular boilers at 115 lbs. pressure and two Corliss engines of 1,300 h.p. and 200 h.p., direct connected, respectively, to a 1,000-k.v.a. and a 150-k.v.a., 3-ph., 60-cy., 550-v., generator. Practically entire load is for mill operation, only a small portion being required to supply the town. **Distribution:** 1 mi. of streets; primaries at 550 v. and secondaries at 110 v.; 13 line transformers, of 72 k.w. total capacity. Number of consumers, 120; connected load, 36 k.w. **Rates:** Service mostly to employees. Flat rate of 25 cents per lamp per month. Street lighting: enclosed arc lamps.

BORDEN (158). Supplied from oil-engine plant of D. E. Crabb. **Power Plant:** Corrugated iron building, 75 x 14 ft.; contains one 12-h.p. oil engine, belted to a 10-k.w., 110-v., d.c. generator. Fuel: kerosene oil; consumption, 15 gal. per night, at 23 cents per gal. Maximum load, 10 k.w. Night service only. Value of plant, $3,000. Installed 1910. **Distribution:** 1 mi. of streets, at 110 v., d.c. Number of consumers, 33; connected load, 10 k.w. for lighting. Value of system, $4,000. **Rates:** Meter rate, 20 cents per k.w.h. Flat rate, $5 to $10 per lamp per year. Street lighting: 25-w. tungsten lamps· rate, 20 cents per k.w.h.

BROADVIEW (877). Supplied from a municipal producer-gas plant. **Power Plant:** Frame building, 66 x 18 ft.; contains a gas producer and a 75-h.p. gas engine, belted to a 50-k.v.a.,

See page 12 for explanation of abbreviations used in this report.

NOTE—Statistics of population extracted from the Census of 1916.

3-ph., 60-cy., 2,200-v. generator. Fuel: pea anthracite coal, at $10.50 per ton. Night service only. Value of plant, $10,000. Installed 1914. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 25 line transformers, of 50 k.w. total capacity. Number of consumers, 133; connected load, 40 k.w. for lighting. Value of system, $10,000. **Rates:** 20 cents per k.w.h. Street lighting: 80-c.p. tungsten lamps, at $20 per lamp per year.

CANORA (835). Supplied from a municipal oil-engine plant. **Power Plant:** Brick building, 45 x 52 ft., containing a 96-h.p. Diesel oil engine, direct connected to a 63-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel, oil distillate; consumption, 11,000 gal. per annum, at 12½ cents per gal. Maximum load, 63 k.w. Night service only. Value of plant, $27,300. Cost of generation, 10 cents per k.w.h. Installed 1914. **Distribution:** 3½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 13 line transformers, of 68 k.w. total capacity. Number of consumers, 140. Value of system, $8,700. **Rates:** 15 cents per k.w.h., less 10 per cent discount. Street lighting: 60-w. and 100-w. tungsten lamps, at 10 cents per k.w.h.

CARLYLE (412). Supplied from municipal steam plant. **Steam Plant:** Brick building, 64 x 29 ft.; contains two 70-h.p. return tubular boilers, at 150 lbs. pressure, and one 52-h.p. engine, direct connected to a 35-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: Souris coal, at $2.95 per ton. Night service only. Value of plant, $14,000. Cost of generation, 17 cents per k.w.h. Installed 1913. **Distribution:** 3 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 8 line transformers, ranging from 1 k.w. to 5 k.w. Value of system, $6,000. **Rates:** 18 cents per k.w.h. Street lighting: 250-c.p. lamps, at $30 per lamp per year.

DAVIDSON (513). Supplied from a municipal producer-gas plant. **Power Plant:** Frame building, 26 x 54 ft.; contains one 150-h.p. gas producer; also one 125-h.p. and one 65-h.p. gas engine, the first direct connected to a 75-k.v.a. and the other belted to a 30-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: pea anthracite; consumption, 150 tons per year, at $10 per ton. Night service only. Value of plant, $15,000. Cost of generation, 9 cents per k.w.h. Installed 1912. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 8 line transformers of 42 k.w. total capacity. Number of consumers, 125; connected load, 360 k.w. for lighting and 12 h.p. in motors. Value of system, $5,000. **Rates:** 20 cents per k.w.h. Street lighting: 100-c.p. tungsten lamps, at $5.40 per lamp per year.

EARL GREY (256). Supplied from a municipal oil-engine plant. **Power Plant:** Frame building on concrete foundations, 12 x 30 ft.; contains a 15-h.p. oil engine belted to a 10-k.w. 110-v., d.c. generator. Fuel: kerosene oil; average consumption, 15 gal. per night, at 22½ cents per gal. Maximum load, 9 k.w. Night service only. Value of plant, $2,200. Installed 1916. **Distribution:** 2 mi. of streets, at 110 v., d.c. Number of consumers, 52; connected load, 13 k.w. **Rates:** 25 cents per k.w.h. Street lighting: 100-w. lamps, at a total charge of $240 per year.

EASTEND (378). Supplied from oil-engine plant of Eastend Garage. **Power Plant:** Metal-covered frame building, 28 x 52 ft.; contains a 25-h.p. oil engine, belted to a 15-k.w., 125-v., d.c. generator. Fuel: kerosene oil; consumption, 2 gals. per hour, at 22 cents per gal. Night service only. Value of plant, $3,000. Cost of generation, 12 cents per k.w.h. Installed 1914. **Distribution:** 2 mi. of streets, at 125 v., d.c. Number of consumers, 64; connected load, 16 k.w. for lighting. Value of system, $2,000. **Rates:** 18 cents per k.w.h. Street lighting: 100-w. lamps, at $48 per lamp per year.

ESTEVAN (2,140). Supplied from a municipal steam plant. **Steam Plant:** Brick building, 69 x 38 ft.; contains two 125-h.p. water tube boilers; one 200-h.p. and one 125-h.p. compound engine, direct connected, respectively, to a 125-k.w. and a 75-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: lignite coal; yearly consumption, 2,499 tons, at $1.80 per ton. Maximum load, 150 k.w. Load factor, 38 per cent. Continuous service. Value of plant,

$36,000. Cost of generation, 4·44 cents per k.w.h. Installed 1911. **Distribution:** 14¾ mi. of streets; primaries at 2,200 v. and secondaries at 100 v.; 71 line transformers, ranging from 2 k.w to 30 k.w. Number of consumers, 500; connected load, 125 k.w. for lighting and 247 k.w. in motors. Value of system, $43,437. **Rates:** Domestic lighting, 10 cents per k.w.h.; appliances, 1 cent per k.w.h., with a monthly minimum; commercial lighting, 6 to 8 cents per k.w.h.; power, 6 cents per k.w.h. Street lighting: 60-w. to 200-w. nitro lamps, rate 3 cents per k.w.h.

FORT QU'APPELLE (295). Supplied from oil-engine plant of S. P. Bennett. **Power Plant:** Metal-covered frame building, 24 x 24 ft.; contains one 25-h.p. semi-Diesel oil engine, belted to a 15-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel, kerosene; yearly consumption, 3,500 gal., at 21½ cents per gal. Maximum load, 15 k.v.a. Night service only. Value of plant, $3,000. Cost of generation, 18 cents per k.w.h. Installed 1914 **Distribution:** 6½ mi. of streets and roads; primaries at 2,300 v. and secondaries at 115 v.; 8 line transformers, of 15 k.w. total capacity. Number of consumers, 65; connected load, 30 k.w. for lighting and 1 h.p. for power. Value of distribution system, $5,000. **Rates:** 20 cents per k.w.h., less 10 per cent discount. Street lighting: 100-w. lamps, at $20 per lamp per year.

GOVAN (500). Supplied from oil-engine plant of J. W. Henry. **Power Plant:** Building, 18 x 36 ft. Equipment: one 20-h.p. oil engine, belted to a 12½-k.w., 115-v., d.c. generator. Fuel, 4 gals. of kerosene per hour, at 21 cents per gal. Maximum load, 14½ k.w. Night service only. Value of plant, including distribution system, $5,000. Installed 1913. **Distribution:** 1½ mi. of streets, at 115 v., d.c. Number of consumers, 60. **Rates:** 25 cents per k.w.h. Street lighting: 100-w. lamps, at 25 cents per k.w.h.

GRENFELL (873). Supplied from municipal producer-gas plant. **Power Plant:** Frame building, 24 x 70 ft., containing a gas producer and one 64-h.p. and one 15-h.p. gas engine, belted, respectively, to a 30-k.v.a. and a 15-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: pea anthracite coal; consumption, 94 tons per year, at $10.50. Night service only. Value of plant, $21,000. Installed 1913. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 11 line transformers, of 33 k.w. total capacity. Number of consumers, 145; connected load, 48 k.w. in lighting and appliances. Value of system, $7,000. **Rates:** 20 cents per k.w.h., less 20 per cent discount. Street lighting: 100-w. tungsten lamps, at $24 per lamp per year.

GULL LAKE (712). Supplied from producer-gas plant of J. Hutchinson. **Power Plant:** Frame building, 16 x 60 ft., containing a gas producer and a 64-h.p. gas engine, belted to a 30-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: anthracite pea coal at $10.65 per ton. Maximum load, 30 k.w. Night service only. Value of plant, including distribution system, $16,046. Installed 1912. **Distribution:** 3¼ mi. of streets; primaries at 2,300 v. and secondaries at 115 v.; 11 line transformers, ranging from 3 k.w. to 5 k.w. Number of consumers, 150; connected load, 30 k.w. all for lighting. **Rates:** 18 cents per k.w.h., with a meter rental. Street lighting: 100-w. lamps, at $43.20 per lamp per year.

HERBERT (912). Supplied from producer-gas plant of H. M. Klassen. **Power Plant:** Frame building, 18 x 80 ft., containing a gas producer and one 60-h.p. gas engine, belted to a 30-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea coal; consumption, 140 tons per year, at $11.80 per ton. Maximum load, 54 h.p. Night service only. Value of plant, $24,000. Cost of generation, 12 cents per k.w.h. Installed 1913. **Distribution:** 4½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 17 line transformers, of 59 k.v.a. total capacity. Number of consumers, 149; connected load, 54 k.w. for lighting. Value of system, $8,000. **Rates:** 16 cents per k.w.h. Street lighting: 100-w. lamps, at $36 per lamp per year.

HUMBOLDT (1,435). Supplied from municipal steam plant. **Steam Plant:** Brick building, 90 x 40 ft.; contains two 100-h.p. tubular boilers at 115 lbs. pressure; one 200-h.p. and one 50-h.p. simple engine, the larger one direct connected to a 125-k.v.a. and the other belted to a 35-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: slack and run-of-mine coal at $2.65 and $4.30 per ton, respectively. Maximum load, 132 k.v.a. Night service only. Value of plant, $46,000. Cost of generation, 5·36 cents per k.w.h. Installed 1913. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 500 v.; 32 line transformers, ranging from 1 k.w. to 50 k.w. Number of consumers, 252. Value of system $17,000. **Rates:** Lighting, 11 to 17 cents per k.w.h.; power, 6 to 10 cents per k.w.h.; all subject to 25 per cent discount. Street lighting: 40-w. to 100-c.p. tungsten lamps; rate 11 cents per k.w.h.

INDIAN HEAD (1,334). Supplied from municipal steam plant. **Steam Plant:** Brick building, 36 x 50 ft., with boiler room 24 x 40 ft.; contains two 175-h.p. water-tube boilers and one 225-h.p. Corliss engine, direct connected to a 150-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 130 k.w. Fuel: semi-anthracite coal; consumption, 900 tons per year, at $6.90 per ton. Night service only. Value of plant, $45,000, including system of distribution. Cost of generation, 8 cents per k.w.h. Installed 1906. **Distribution:** 8½ mi. of streets; primaries at 2,200 v. and secondaries at 104 v. and 208 v.; 50 line transformers, ranging from 2. k.w. to 10 k.w. Number of consumers, 260; connected load, 140 k.w. for lighting. **Rates:** From 13 to 17 cents per k.w.h., according to consumption and uses. Street lighting, enclosed arc and 100-c.p. lamps at $70 per arc lamp yearly.

KAMSACK (1,202). Supplied from municipal producer-gas plant. **Power Plant:** Brick and concrete building, 35 x 75 ft., with extension 35 x 48 ft.; contains two 250-h.p. gas producers and one 200-h.p. gas engine, direct connected to a 125-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 125 h.p. Fuel: pea anthracite coal; yearly consumption, 300 tons, at $10.75. Night service only. Value of plant, $28,000. Cost of generation, 5½ cents per k.w.h. Installed 1915. **Distribution:** 5 mi. of streets; with ½ mi. underground, primaries at 2,200 v. and secondaries at 110 v ; 7 line transformers, of 35 k.w. total capacity. Number of consumers, 200; connected load, 12 k.w. for lighting and 65 h.p. in motors. Value of distribution system, $12,000. **Rates:** Lighting, 12 cents per k.w.h.; power, 8 cents per k.w.h. Street lighting: 60-w. and 100-w. lamps, at 8 cents per k.w.h.

KINDERSLEY (770). Supplied from municipal steam plant. **Steam Plant:** Metal-covered frame building, 40 x 64 ft.; contains two 116-h.p. return tubular boilers, at 125 lbs. pressure, and one 125-h.p. engine, direct connected to a 75-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 55 k.w. Fuel: Drumheller run-of-mine coal; consumption, 1,200 tons per year, at $6.15. Service, 9 to 18 hours per day. Cost of generation, 12 cents per k.w.h. Installed 1913. **Distribution:** 1½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 7 line transformers, of 60 k.w. total capacity. Number of consumers, 174; connected load, 117 k.w. for lighting and 5 h.p. in motors. **Rates:** Lighting, 12½ to 16 cents per k.w.h., according to consumption; power, 16 cents per k.w.h. Street lighting: 100-w. lamps, at 3 cents per hour per lamp.

LANG (291). Supplied from gasolene-engine plant of W. A. Perkins. **Power Plant:** One 10-h.p. gasolene engine, direct connected to a 6-k.w., 110-v., d.c. generator. Fuel: gasolene; consumption, 7 gal. per day, at 42 cents per gal. Value of plant, $3,421. Installed 1917. **Distribution:** 1 mi. of streets, at 110 v., d.c. Number of consumers, 25; connected load, 11 k.w. for lighting. Value of distribution system, $600. **Rates:** 20 cents per k.w.h.

LANGHAM (352). Supplied from a municipal producer-gas plant. **Power Plant:** Building, 72 x 16 ft.; contains a gas producer and one 50-h.p. suction gas engine, belted to a 30-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 28 k.w. Fuel: pea anthracite coal; consumption, 80 tons per year, at $10 per ton. Night service only. Value of plant, $10,000.

Cost of generation, 16 cents per k.w.h. Installed 1913. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 30 k.w. total capacity. Number of consumers, 90. Value of distribution system, $3,000. **Rates:** 16 cents per k.w.h. Street lighting: 100-c.p. nitro lamps, at $22.50 per lamp per year.

LASHBURN (235). Supplied from oil-engine plant of W. W. Morrison. **Power Plant:** Frame building, 18 x 36 ft.; contains one 25-h.p. oil engine, belted to a 15-k.w., 110-v., d.c. generator. Fuel: kerosene; consumption, 4,800 gal. per year, at 21½ cents per gal. Continuous service. Value of plant, $2,500. Cost of generation, 13 cents per k.w.h. Installed 1913. **Distribution:** 1 mi. of streets or roads at 110 v., d.c. Number of consumers, 50; connected load, 35 k.w. for lighting and 2 h.p. in motors. Value of system, $2,500. **Rates:** 20 cents per k.w.h. Street lighting: 60-w. lamps, at $15 per lamp per year.

LEADER (490). Supplied from oil-engine plant of H. Lake. **Power Plant:** Building, 30 x 40 ft.; contains one 37½ and one 25-h.p. oil engine, belted, respectively, to a 25-k.w. and a 15-k.w., 120-v., d.c. generator: Fuel: kerosene at 22 cents per gal. Night service only. Value of plant, including system of distribution, $18,000. Installed 1916. **Distribution:** 5 mi. of streets at 120 v., d.c. Number of consumers, 300. **Rates:** 15 cents per k.w.h. Street lighting: 250-w. lamps, total cost for service, $300 per year.

LLOYDMINSTER (404). Supplied from producer-gas plant of W. Johnson & Son; system also includes village of Lloydminster, (Alta). **Power Plant:** Metal covered frame building, approximately 40 x 60 ft.; contains a gas producer and a 100-h.p. gas engine, direct connected to a 65-k.w., 220-v., d.c. generator; one 400-amp.-hr., 126-cells storage battery, which provides a continuous service, and is also used at peak load. Fuel: Pennsylvania pea coal; consumption, 240 tons per year, at $11 per ton. Value of plant, $20,000. Cost of generation, 6½ cents per k.w.h. Installed 1907. **Distribution:** 3½ mi. of streets at 220 v., d.c. Number of consumers, 150; connected load, 60 k.w. Value of system, $4,000. **Rates:** 13 to 15 cents per k.w.h. according to consumption. Street lighting: 32-c.p. and 60-w. tungsten and enclosed arc lamps, at $14.40, $18 and $75 per lamp per year, respectively.

LUMSDEN (615). Supplied from oil-engine plant of the Lumsden Electric Light and Power Co. **Power Plant:** Frame building, 18 x 40 ft.; contains one 25-h.p. and one 15-h.p. oil engine, belted, respectively, to a 15-k.v.a. and a 10-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 14 k.w. Fuel: kerosene; consumption, 3,250 gal. per year, at 22 cents per gal. Night service only. Value of plant, including distribution system, $21,000. Cost of generation, 19 cents per k.w.h. Installed 1911. **Distribution:** 3¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 15 line transformers, of 42 k.w., total capacity. Number of consumers, 91; connected load, 40 k.w. for lighting and 12 k.w. in appliances. **Rates:** 20 cents per k.w.h.

MAPLE CREEK (1,140). Supplied from steam plant of Maple Creek Light, Power and Milling Co.; operated in connection with mill. **Steam Plant:** Brick building, 60 x 38 ft.; contains two 100-h.p. return tubular boilers, at 120 lbs. pressure, and one 100-h.p. engine, belted to a 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal; consumption, 5 tons per 24 hrs., at $4.75 per ton. Maximum load, 85 k.w. Night service only. Value of plant, $11,500. Installed 1911. New unit of 125 k.w. being installed, at additional cost of $10,000; plant to give continuous service. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 25 line transformers, ranging from 3 k.v.a. to 7½ k.v.a. Number of consumers, 175. Value of distribution system, $5,000. **Rates:** 12 to 15 cents per k.w.h. Street lighting: 60-c.p. nitro lamps, at $30 per lamp per year.

MELFORT (971). Supplied by municipal oil-engine plant. **Power Plant:** Brick building, 72 x 39 ft.; contains one 150-h.p. Diesel oil engine, direct connected to a 100-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil; consumption, 16,123 gal. per year, at 12 cents

per gal. Output divided, 71 per cent for lighting and 29 per cent for power. Night service only. Value of plant, including distribution system, $35,000. Cost of generation, 3 cents per k.w.h. Installed 1913. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 15 line transformers, including those for fire pump, of 160 k.w. total capacity. Number of consumers, 235; connected load, 65 k.w. for lighting and 100 h.p. in motors, the latter for water-works. **Rates:** 10 cents per k.w.h. Street lighting: 80-c.p. nitro and 100-w. tungsten lamps, at $15.25 per lamp per year.

MELVILLE (2,100). Supplied from municipal producer-gas plant. **Power Plant:** Concrete building, 60 x 60 ft.; contains one 250-h.p. suction gas producer, one 200-h.p. and one 85-h.p. gas engine, direct connected, respectively, to a 155-k.w. and a 75-k.w., 3-ph., 60 cy., 2,300-v. generator. Fuel: anthracite pea coal, at $11 per ton. Consumption, 1 lb. of coal per h.p.-hour. Service, 21 hours per day. Installed 1911. **Distribution:** 15 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 40 line transformers, of 230 k.w. total capacity. Number of consumers, 350; connected load, 125 k.w. for lighting and 175 h.p. in motors. **Rates:** Lighting, 8 to 9·9 cents net, per k.w.h.; power flat rate, $26.40 per h.p.-year. Street lighting: 100-c.p. nitro lamps; rate, 10 cents per k.w.h.

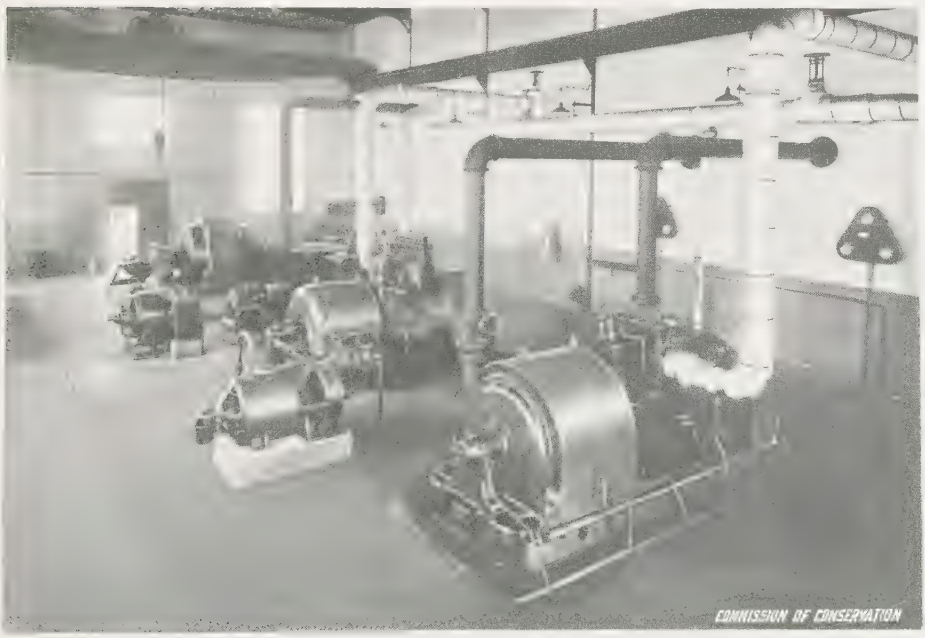
MILESTONE (450). Supplied from oil-engine plant of Milestone Electric Light Works. **Power Plant:** Brick and reinforced concrete building, 18 x 34 ft.; contains one 25-h.p. semi-Diesel oil engine, belted to a 20-k.w., 115-v., d.c. generator. Fuel: crude oil; consumption, 2,000 gal. per year. Night service only. Value of plant, $10,000. Fuel cost for generation, 2 cents per k.w.h. Installed 1907. **Distribution:** 1½ mi. of streets, at 115 v., d.c. Number of consumers, 61; connected load, 18 k.w. for lighting. Value of distribution system, $2,000. **Rates:** 75 cents per 25-w. lamp per month. Street lighting: 100-w. nitro and 60-w. tungsten lamps, at $31.20 and $16.80 per lamp per year, respectively.

MOOSEJAW (16,934). Supplied from municipal steam plant. **Steam Plant:** Concrete and steel building, 150 x 86 ft.; contains four 285-h.p. and four 375-h.p. water-tube boilers, at 160 lbs. pressure; three turbine units, of 500 k.w., 1,000 k.w. and 1,500 k.w., respectively; energy at 3 ph., 60 cy., 2,300 v. Fuel: semi-bituminous coal; consumption, 20,000 tons yearly at $3.90 per ton. Maximum demand, 1,950 k.w. Load factor, 38·2 per cent. Continuous service. Value of plant, $635,000. Cost of generation, including overhead charges, 2·21 cents per k.w.h., and, including distribution, 2·87 cents per k.w.h. Installed 1904; rebuilt 1912. **Distribution:** 48 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. to 440 v. 274 line transformers, ranging from 2 k.w. to 200 k.w. capacity. Number of consumers, 4,027. Value of distribution system, $255,000. **Rates:** Lighting, 7 cents per k.w.h.; commercial lighting, 3 to 7 cents per k.w.h.; heating and appliances, 3 to 5 cents per k.w.h.; power, 0·95 cent to 3·5 cents per k.w.h., according to consumption and restrictions. All rates subject to 10 per cent discount. Street lighting: 6·6-amp. magnetite arc, 100-w. and 60-w. tungsten lamps; rate, from 2 to 2½ cents per k.w.h., plus fixed charges and maintenance.

MORSE (452). Supplied from producer-gas plant of E. Lapoujade. **Power Plant:** Metal-clad frame building, 80 x 22 ft.; contains gas producer and one 68-h.p. suction gas engine, belted to a 30-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea anthracite coal; consumption, 125 tons per year, at $12.40 per ton. Night service only. Value of plant, including distribution system, $30,000. Cost of generation, 10 cents per k.w.h. Installed 1914. **Distribution:** 2½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 9 line transformers, of 31 k.w. total capacity. Number of consumers, 87; connected load, 24 k.w. for lighting and 2 h.p. in motors. **Rates:** 18 cents per k.w.h. Street lighting: 100-w. lamps, at $36 per lamp per year.

NORTH BATTLEFORD (3,145). Supplied from municipal steam plant, the system also supplying energy to the Battleford distribution system. **Steam Plant:** Concrete and brick buildings, 70 x 45 ft. and 35 x 45 ft., with boiler room 80 x 36 ft.; contains two water-tube

MUNICIPAL STEAM PLANT, PRINCE ALBERT, SASK.—PUMP-HOUSE ON LEFT.



MUNICIPAL STEAM PLANT, MOOSE JAW, SASK.—STEAM TURBINE UNITS.

and two return tubular boilers of 500 h.p. total capacity; one 750-h.p. and one 200-h.p. compound condensing engine, direct connected, respectively, to a 635-k.w. and a 125-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: lignite slack coal, at $2.55 per ton. Maximum load, 400 k.w. Continuous service. Value of plant, $83,000. Fuel cost for generation, 1 cent per k.w.h. Installed 1909, additions in 1913. **Distribution:** 30 mi. of streets and roads, primaries at 2,200 v., secondaries at 110 and 220 v.; 75 line transformers, of 450 k.w. total capacity. Number of consumers, 725; connected load in motors alone, 450 h.p. Value of distribution system, $73,000. **Rates:** Lighting, 7 to 9 cents per k.w.h.; power, 2 to 6 cents per k.w.h.; appliances, 4 cents per k.w.h. All rates subject to monthly minimum and meter rental. Street lighting: 6·6-amp. enclosed arc, 300-w. nitro, and 60-w. tungsten lamps; rate, 7 cents per k.w.h.

NORTH PORTAL (222). Supplied by International Power Co., from steam plant in Portal, N.D. Plant mainly supplies Portal, and has a total capacity of 82 k.w. at 220 v., d.c. **Distribution:** In North Portal, ¾ mi. of streets, at 220 v., d.c. Number of consumers, 30; connected load, 12 k.w. for lighting and 6 k.w. in appliances. Value of distribution system, $1,500. **Rates:** Meter rate, 15 to 18 cents per k.w.h., with a minimum charge. Flat rate, 75 cents to $1 per lamp per month. Street lighting: 50-w. tungsten lamps, at $18 per lamp per year.

OUTLOOK (613). Supplied from municipal producer-gas plant. **Power Plant:** Brick building, 40 x 40 ft.; contains a gas producer and a 75-h.p. gas engine, belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: anthracite pea coal; consumption, 240 tons per year, at $11.80 per ton. Maximum load, 50 k.w. Value of plant, including system of distribution, $19,806. Cost of generation, 18 cents per k.w.h. Night service only. Installed 1911. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 11 line transformers, of 115 k.w. total capacity. Number of consumers, 168; connected load, 25 k.w. for lighting. **Rates:** 16 cents per k.w.h. Street lighting: enclosed arc and 110-c.p. incandescent lamps, at approximate yearly charges of $100 and $25 per lamp, respectively.

OXBOW (678). Supplied from municipal oil-engine plant. **Power Plant:** Frame building, 40 x 40 ft.; contains one 25-h.p. oil engine, belted to a 20-k.w., 115-v., d.c. generator. A 66-cell, 420-amp.-hr. storage battery provides for a continuous service. Fuel, 2,500 gal. kerosene per year at 23 cents. Maximum load, 17 k.w. Value of plant, including distribution system, $18,000. Installed 1917. **Distribution:** 3 mi. of streets, at 115 v., d.c. Number of consumers, 85; connected load, 14 k.w. for lighting and 2 h.p. in motors. **Rates:** Meter rate, 20 cents per k.w.h., with a monthly minimum. Flat rate, 25 cents per 20-w. lamp per month. Street lighting: 200-w. nitro and 100-w. tungsten lamps, at $22.50 per 100-w. per year.

PONTEIX (335). Supplied from oil-engine plant of A. L. Thompson. **Power Plant:** Frame building, 14 x 26 ft.; contains one 20-h.p. oil engine, operating a 10-k.w., 110-v., d.c. generator. Fuel: kerosene, at 22½ cents per gallon. Night service only. Value of plant, $3,000. Installed 1917. **Distribution:** 1 mi. of streets, at 110 v., d.c. Number of consumers, 46; connected load, 10 k.w. for lighting. Value of distribution system, $700. **Rates:** 1 cent to 2 cents per watt per month. Street lighting: 100-w. lamps, at $12 per lamp per year.

PRINCE ALBERT (6,436). Supplied from municipal steam plant. **Steam Plant:** Brick building, 53 x 56 ft., with boiler room, 34 x 70 ft.; contains four 150-h.p. return tubular and two 300-h.p. water-tube boilers, at 150 to 165 lbs. pressure; one 1,100-h.p. and one 420-h.p. compound condensing Corliss engine, direct connected, respectively, to a 632-k.v.a. and 260-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Maximum demand, 570 k.w. Output divided, 56 per cent for lighting and 44 per cent for power. Average load factor, 50 per cent. Fuel: mill refuse and cord wood; yearly consumption, 4,188 cords of former at $1.25 per cord and

2,850 cords of latter at $4.50 per cord. Continuous service. Value of plant, $100,000. Cost of generation, 2·85 cents per k.w.h. Installed 1907. **Distribution:** 33 mi. of streets, with 1¾ mi. underground; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 195 line transformers, of approximately 1,526 k.w. total capacity. Number of consumers, 1,208; connected load, 1,200 k.w. for lighting and 250 k.w. in motors. Value of system, $150,000. **Rates:** Lighting, 8 cents per k.w.h., with a minimum charge, less discounts of 5 to 15 per cent, according to consumption ; power, from 3 to 5 cents per k.w.h., plus a fixed charge of $1 per h.p. per month, less 10 per cent discount for restricted service only. Street lighting: enclosed arc and 100-c.p. to 250-c.p. tungsten lamps; rate, 4 cents per k.w.h.

QU'APPELLE (722). Supplied from producer-gas plant of Qu'Appelle Electric Light Co. **Power Plant:** Concrete building, 22 x 70 ft.; contains a gas producer and one 100-h.p. gas engine, belted to two 65-k.w., 220-v., d.c. generators. Fuel: pea anthracite; consumption, 125 tons per year, at $10 per ton. Night service only. Value of plant, $12,000. Installed 1912. **Distribution:** 2 mi. of streets, at 220 v., d.c. Number of consumers, 100; connected load, 100 k.w. Value of system, $3,000. **Rates:** 18 cents per k.w.h. Street lighting: 60-w. and 100-w. tungsten lamps, at $23.30 per 100-w. lamp per year.

RADISSON (438). Supplied under municipal control; obtained from oil-engine plant of Radisson Iron Works. **Power Plant:** Installed in shop; contains one 25-h.p. and one 8-h.p. oil engine, operating a 20-k.w. and a 5-k.w., 120-v., d.c. generator. An 80-amp.-hr. storage battery provides continuous service. Maximum load, 16 k.w. Fuel: kerosene; consumption, 5,500 gal. per year, at 22 cents per gal. Value of plant, $3,000. Installed 1912. **Distribution:** 1½ mi. of streets, at 120 v., d.c. Number of consumers, 50; connected load, 18 k.w. for lighting and 1½ h.p. in motors. Value of system, $2,000. **Rates:** 20 cents per k.w.h. Street lighting: 100-w. and 200-w. nitro lamps; rate, 18 cents per k.w.h.

REGINA (26,127). Supplied from municipal steam plant. **Steam Plant:** Brick and reinforced concrete building, 172 x 222 ft.; contains six 500-h.p. water-tube boilers, at 200 lbs. pressure, and three steam turbine units, two of 1,500 k.w. and one of 3,000 k.w.; energy at 3 ph., 60 cy., 2,200 v. Maximum demand, 4,200 k.w. Load factor, 30 per cent. Continuous service. Cost of generation, 1·93 cents per k.w.h. Fuel: bituminous coal; consumption, 18,000 tons per year, at $6.80 per ton. Value of plant, $700,000. Provision for future addition of eight 500-h.p. boilers and three 3,000-k.w. turbine units. Installed 1915, replacing a steam plant completed in 1905. Latter building now used as substation; contains one 1,200-k.w. rotary converter, two 400-k.w. steam-driven d.c. railway generators, street lighting transformers and water-works equipment, including water-tube boilers of 1,000 h.p. total capacity. **Distribution:** 101 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 445 line transformers, of 5,650 k.w. total capacity. Number of consumers, 5,577; connected load, 4,175 k.w. for lighting and 3,393 k.w. in motors. Value of distribution system, $480,146. **Rates:** Lighting, 4 to 7 cents per k.w.h., plus a fixed charge of 50 cents per month per h.p. connected, less 10 per cent discount; power, 1·5 to 5 cents per k.w.h., according to consumption and restriction, plus fixed charge of 50 cents per month per h.p. connected, less 10 per cent discount; heating, same as power, but if restricted to day use, 2 cents per k.w.h.; special power rate for large consumers, 1·1 to 1·25 cents per k.w.h. Street lighting: enclosed and magnetite arc lamps; rate, 1·25 cents per k.w.h. plus maintenance.

ROSETOWN (731). Supplied from oil-engine plant of Rosetown Electric Light and Power Co. **Power Plant:** Frame building, 26 x 36 ft.; contains a 75-h.p. semi-Diesel oil engine, belted to a 60-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 40 k.w. Fuel: oil distillate; consumption, 25 to 45 gal. per night, at 19½ cents per gal. Night service only Value of plant, $10,000. Installed 1918, replacing steam plant installed in 1912. **Distribution:** 3 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 13 line transformers, of 55 k.w. total capacity. Number of consumers, 110; connected load, 45 k.w.

for lighting and 13 k.w. in appliances. Value of system, $6,000. **Rates:** Meter rate, 15 cents to 18 cents per k.w.h., according to consumption, with monthly minimum and meter rental; flat rate, 50 cents per lamp per month. Street lighting: 60-w. lamps, at $12.70 per lamp per year.

ROSTHERN (1,200). Supplied from municipal oil-engine plant. **Power Plant:** 40-h.p. semi-Diesel oil engine, belted to a 25-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 25 k.w. Night service only. Value of power plant, $10,000. Installed, 1918. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 10 line transformers, of 48 k.w. total capacity. Number of consumers, 105. Value of distribution system, $10,000. **Rates:** 17 cents per k.w.h., less 10 per cent discount. Street lighting: 100-w. to 300-w. nitro lamps.

ROULEAU (495). Supplied from a municipal producer-gas plant. **Power Plant:** Brick and concrete building, 68 x 40 ft.; contains a gas producer and one 170-h.p. gas engine, operating a 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 32 k.w. Fuel: Lignite coal; consumption, 430 tons per year, at $3 per ton. Night service only. Value of plant, including distribution system, $80,000. Installed 1911. **Distribution:** 5 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 15 line transformers, ranging from 2 to 5 k.w. **Rates:** 17 cents per k.w.h. Street lighting: 80-c.p. tungsten lamps, at $15 per lamp per year.

SALTCOATS (491). Supplied from municipal producer-gas plant. **Power Plant:** Concrete block building, 30 x 40 ft.; contains a gas producer and a 63-h.p. gas engine, belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: pea anthracite coal; consumption, 65 tons per year, at $10. Night service only. Value of plant, $1,600. Installed 1912. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of 40 k.w. total capacity. Number of consumers, 96; connected load, 31 k.w. for lighting. Value of distribution system, $7,650. **Rates:** 15 cents per k.w.h. Street lighting: 80-w. lamps, at $17 per lamp per year.

SASKATOON (21,048). Supplied from a municipal steam plant. **Steam Plant:** Steel and brick building, 150 ft. x 85 ft.; contains eight 500-h.p. water-tube boilers, at 150 lbs. pressure, equipped with chain grate stokers, super-heaters, economizers, etc.; one 3,200-k.w. and one 2,000-k.w. steam turbine units and one 1,000-h.p. compound condensing engine direct connected to a 750-k.w. generator; all energy at 2 ph., 60 cy., 2,300 v., while one 600-k.w. and two 300-k.w. motor generator units supply energy for electric railway purposes at 550 v., d.c. Fuel: bituminous, sub-bituminous and Drumheller coal; consumption, 26,200 tons per year, at an average cost of $3.50 per ton. Maximum load, 3,600 k.w.; average yearly load factor, 35·2 per cent. Output divided, 34 per cent for lighting, 45 per cent for power and 21 per cent for electric railway. Value of plant, $547,390. Cost of generation, 2·7 cents per k.w.h. First installation 1908, present plant installed 1912. **Substation:** Energy stepped up for transmission to government elevator. Equipment, three 500-k.v.a. station transformers, stepping voltage from 2,200 v. to 11,000 v. at 2 ph., 60 cy. One of the transformers is a spare unit. **Distribution:** 57 mi. of streets, with 12 mi. of single underground cable; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 349 line transformers, of 6,974 k.w. total capacity. Number of consumers, 4,760; connected load, 1,850 k.w. for lighting and 5,220 h.p. in motors. **Rates:** Lighting, 6 to 8 cents per k.w.h. less 10 per cent discount; appliances, 2¼ cents per k.w.h.; power, 1·25 to 5·4 cents per k.w.h., according to consumption. Street lighting: enclosed arc lamps, at $70 per lamp per year, and 60-w. and 100-w. tungsten lamps; rate 3 cents per k.w.h.

SCOTT (316). Supplied from municipal oil-engine plant. **Power Plant:** Brick building, 40 x 80 ft.; contains one 100-h.p. Diesel oil engine, direct connected to a 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil or distillate; consumption, 7,000 gal. per year, at 20

cents per gal. Maximum demand, 45 k.w.; output divided, 80 per cent for lighting and 20 per cent for power; latter almost exclusively used for waterworks. Night service only. Value of plant, $25,000. Cost of generation, 10 cents per k.w.h. Installed 1912. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 5 line transformers, of 25 k.w. total capacity. Number of consumers, 65; connected load for power in connection with waterworks, 25 h.p. Value of distribution system, $7,500. **Rates:** Lighting, 15 cents per k.w.h.; power, 10 cents per k.w.h. Street lighting: 100-c.p. lamps, at 10 cents per k.w.h.

SEMANS (288). Supplied from oil-engine plant of Semans Electric Light Co. **Power Plant:** Frame building, 14 x 24 ft.; contains one 15-h.p. and one 9-h.p. oil engine, direct connected, respectively, to a 12½-k.w. and a 5½-k.w., 115-v., d.c. generator. Fuel: kerosene; consumption, 15 gal. per 11-hr. run, at 22 cents per gal. Maximum load, 12½ k.w. Night service only. Cost of generation, 10 cents per k.w.h. Installed 1911. **Distribution:** ½ mi. of streets, at 115 v., d.c. Number of consumers, 54; connect d load, 30 k.w. for lighting. **Rates:** Meter rate, 20 cents per k.w.h., with meter rental and monthly minimum. Flat rate, 42 to 50 cents per lamp per month. Street lighting: 100-c.p. and 250-c.p. lamps, at $21 per 100 c.p. per year.

SHAUNAVON (897). Supplied from oil-engine plant of H. G. Eakins. **Power Plant:** Installed in hotel, and operated principally in connection therewith; one 25-h.p. oil engine, belted to a 15-k.w., 110-v., d.c. generator. Storage batteries provide for a continuous service. Fuel: kerosene oil; yearly consumption, 4,700 gals., at 21½ cents per gal. Maximum load, 12 k.w. Value of plant, $4,500. Installed 1914. **Distribution:** ¼ mi. of streets, at 110 v., d.c. Number of consumers, 16; connected load, 15 k.w. for lighting. Value of distribution system, most of which is property of town in connection with street lighting, $400. **Rates:** Flat rate, $1 per 40-w. lamp per month; meter rate, 20 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $33 per lamp per year.

STRASSBURG (544). Supplied from municipal producer-gas plant. **Power Plant:** Brick building, 16 x 50 ft.; contains a suction gas producer and a 50-h.p. gas engine, belted to a 37-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea anthracite coal; consumption, 100 tons per year, at $10.50 per ton. Maximum load, 28 k.w. Night service only. Value of plant, including distribution system, $14,000. Installed 1913. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, ranging from 3 k.w. to 10 k.w. Number of consumers, 130; connected load, 60 k.w. for lighting. **Rates:** 20 cents per k.w.h. Street lighting: 100-c.p. lamps, at $23 per lamp per year.

SWIFT CURRENT (3,181). Supplied from a producer-gas plant and steam plant, both under municipal control. **Producer-gas Plant:** Brick building, 72 x 50 ft.; contains gas producers and one 65-h.p. and one 200-h.p. gas engine, belted, respectively, to a 35-k.w. and a 135-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: lignite coal; consumption, 1,300 tons per year, at $4.80 per ton. Plant operates 16 hours during the day, carrying the day load, while the remaining 8 hours is carried by the steam plant. Value of plant, $45,000. Cost of generation, 1·5 cents per k.w.h. Installed 1911. **Steam Plant:** Brick building, 64 x 101 ft.; contains three 300-h.p. water-tube boilers, at 150 lbs. pressure, one 600-h.p. and one 300-h.p. compound engine, direct connected, respectively, to a 400-k.w. and a 200-k.w 3-ph., 60-cy., 2,200-v. generator. Fuel: British Columbia anthracite coal; consumption, 1,500 tons per year, at $5 per ton. Maximum demand, 350 k.w.; steam plant carries entire load during 8 hours per day, covering the peak load; continuous service provided by gas-producer plant during remainder of day. Load factor for combined plants, 50 per cent; output divided, 71 per cent for lighting and 29 per cent for power. Value of steam plant, $125,000. Cost of generation, 2½ cents per k.w.h. Installed 1913. **Distribution:** 30 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 95 line transformers, ranging from 5 to 25 k.w. Number of consumers, 900; connected load, 600 k.w. for lighting and 300 k.w. in

motors. Value of distribution system, $75,000. **Rates:** Lighting, 6 to 10 cents per k.w.h.; appliances, 2 to 3 cents per k.w.h.; power, 2 to 5 cents per k.w.h. All rates subject to 10 per cent discount, with a monthly minimum. Street lighting: 40-w. and 60-w. tungsten lamps; rate, 2 to 5 cents per k.w.h., according to consumption.

TISDALE (458). Supplied from steam plant of Tisdale Trading and Milling Co. **Steam Plant:** Frame building, 30 x 40 ft.; contains two 125-h.p. boilers, at 140 lbs. pressure; one 125-h.p. engine, belted to a 60-k.w., 3-ph., 60-cy., 550-v. generator. Fuel: wood; consumption, 2½ cords per night, at $3.50 per cord. Night service only. Cost of plant, $25,000. Installed 1914. **Distribution:** 5 mi. of streets; primaries at 550 v. and secondaries at 110 v.; 6 line transformers, of 30 k.w. total capacity. Number of consumers, 75; connected load, 30 k.w. for lighting and 26½ h.p. in motors. Value of distribution system, $4,000. **Rates:** Lighting, 12 cents per k.w.h.; Power, 8 cents per k.w.h.

TUGASKE (271). A few consumers in the neighbourhood supplied by G. A. Turner, from a Delco plant. **Power Plant:** One 2½-h.p. direct-connected unit, operated by gasolene engine. Continuous service supplied by storage batteries. Plant operates at 32 v., d.c. Service supplied to neighbours at nominal cost.

WADENA (449). Supplied from municipal producer-gas plant. **Power Plant:** Frame building, 16 x 78 ft.; contains a gas producer and one 65-h.p. suction gas engine, belted to a 30-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea anthracite coal. Maximum load, 28 k.w. Night service only. Value of plant, $4,000. Cost of generation, 16·4 cents per k.w.h. Installed 1913. **Distribution:** 3 mi. of streets and roads; primaries at 2,300 v. and secondaries at 112 v.; 5 line transformers, of 25 k.w. total capacity. Number of consumers, 101; value of distribution system, $4,000. **Rates:** 20 cents per k.w.h. Street lighting: 80-c.p. tungsten lamps, at $22 per lamp per year.

WATROUS (843). Supplied from producer-gas plant of Watrous Electric Light Co. **Power Plant:** Frame building, on concrete foundation, 20 x 75 ft.; contains a gas producer and a 90-h.p. gas engine, belted to a 50-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea anthracite coal; consumption, 120 tons per year, at $10.10 per ton. Maximum load, 30 k.w. Night service only Value of power plant, $7,400. Installed 1912. **Distribution:** 4½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 10 line transformers, of 72 k.w. total capacity. Number of consumers, 131; connected load, 60 k.w. for lighting. Value of distribution system, $30,600. **Rates:** 18 cents per k.w.h., less discounts of from 10 to 25 per cent, according to uses. Street lighting: 500-w. nitro lamps, at $182 per lamp per year.

WATSON (246). Supplied from oil-engine plant of H. A. Green. **Power Plant:** One 10-h.p. oil engine, belted to a 7½-k.w., 110-v., d.c. generator. Night service only. Installed 1917. **Distribution:** ½ mi. of streets, at 110 v., d.c Number of consumers, 9; connected load, 5 k.w. **Rates:** Flat rate, 2 cents per watt per month.

WEYBURN (3,050). Supplied by municipal steam plant. **Steam Plant:** Brick building, 60 x 100 ft.; contains two 260-h.p. and one 210-h.p. water-tube boiler, at 150 lbs. pressure; one 440-h.p. compound condensing and one 140-h.p. condensing engine, direct connected and belted, respectively, to a 225-k.w. and a 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: Souris lignite coal; yearly consumption, 4,000 tons at $2.75 per ton. Maximum load, 290 k.w. Output divided, 77 per cent for lighting and 23 per cent for power. Continuous service. Value of plant, $100,000. Cost of generation, 2 cents per k.w.h.; including distribution, 8 cents per k.w.h. Installed 1907. **Distribution:** 8 mi. of streets, with ¾ mi. underground; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 72 line transformers, of 420 k.w. total capacity. Number of consumers, 640; connected load, 500 k.w. for lighting and 380 h.p. in motors. Value of distribution system, $36,000. **Rates:** Lighting, 9 cents

per k.w.h.; heating and power, 2 to 5 cents per k.w.h. Street lighting: enclosed arc, 250-c.p. and 100-c.p. nitro lamps, at 8 cents per k.w.h.

WILCOX (243). Supplied from gasolene-engine plant of H. R. Gordon. **Power Plant:** Operated in connection with garage; contains one 10-h.p. gasolene engine, belted to a 7½-k.w., 110-v., d.c. generator. Fuel: 2,200 gal. gasolene per year, at 38 cents per gal. Night service only. Value of plant, including distribution system, $5,000. Installed 1911. **Distribution:** 1 mi. of streets, at 110 v., d.c. Number of consumers, 20; connected load, 6 k.w. for lighting. **Rates:** Flat rate, 3 cents per watt per month. Street lighting: 40-w. tungsten lamps, at $21.40 per lamp per year.

WILKIE (815). Supplied from municipal oil-engine plant. **Power Plant:** Brick building, 42 x 60 ft.; contains one 100-h.p. Diesel oil engine, operating a 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil; consumption, 10,000 gal. per year, at 15·5 cents. Night service only. Value of plant, $20,800. Cost of generation, 3 cents per k.w.h. Installed 1912. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 23 line transformers, ranging from 1 to 10 k.w. Number of consumers, 150; connected load, 45 k.w. for lighting. Value of distribution system, $6,600. **Rates:** 13 to 15 cents per k.w.h. according to consumption, less 10 per cent discount. Street lighting: 80-c.p. nitro lamps; rate, 11 cents per k.w.h.

WOLSELEY (1,054). Supplied from municipal producer-gas and oil-engine plant. **Power Plant:** Frame and brick building, 70 x 50 ft.; contains a gas producer, one 60-h.p. and one 90-h.p. gas engine, and a 50-h.p. oil engine, the first direct connected and other two belted, respectively, to a 50-k.w., a 50-k.w. and a 30-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea anthracite coal and kerosene; yearly consumption, 100 tons of coal, at $9 per ton, and 3,000 gal. of kerosene, at 20 cents per gal. Night service only. Value of plant, $35,000. Cost of generation, including overhead charges, 12 cents per k.w.h. Installed 1906. **Distribution:** 12 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 9 line transformers, of 60 k.w. total capacity. Number of consumers, 180; connected load, 80 k.w. for lighting and 15 h.p. in motors. Value of distribution system, $10,000. **Rates:** Lighting, 16 to 18 cents per k.w.h., according to uses; power, 12 cents per k.w.h. Street lighting: 80-c.p. nitro lamps; rate, 16 cents per k.w.h.

YELLOWGRASS (408). Supplied from municipal oil-engine plant. **Power Plant:** Brick building, 18 x 40 ft., with frame addition, 18 x 24 ft.; contains one 25-h.p. oil engine, belted to a 17-k.w., 115-v., d.c. generator. A 1,200-amp.-hr. storage battery provides for a continuous service. Fuel: kerosene; consumption, 8,740 gal. per year, at 22 cents per gal. Value of plant, $4,000. Cost of generation, 6 cents per k.w.h. Installed 1913. **Distribution:** 5 mi. of streets, at 115 v., d.c. Number of consumers, 95; connected load, 12 k.w. for lighting. Value of distribution system, $8,000. **Rates:** 15 cents per k.w.h. Street lighting: 60-w. nitro lamps, at $50 per lamp per year.

YORKTON (3,144). Supplied from municipal oil-engine plant. **Power Plant:** Brick buildings, 150 x 60 ft. and 50 x 30 ft.; contain one 500-h.p. and one 150-h.p. Diesel oil engine, direct connected, respectively, to one 340-k.w. and one 85-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil; consumption, 50,000 gal. per year, at 10·6 cents per gal. Maximum load, 350 k.w. Output divided, 89 per cent for lighting and 11 per cent for power. Continuous service. Value of plant, $350,228. Cost of generation, 3 cents per k.w.h. Installed 1911. **Distribution:** 17 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 43 line transformers, ranging from 5 to 90 k.w. Number of consumers, 600; connected load, 230 k.w. for lighting, 155 k.w. in motors and 50 k.w. in appliances. Value of distribution system, $17,000. **Rates:** Lighting, 10 cents per k.w.h., less 10 per cent discount; power, 2 to 5 cents per k.w.h., according to consumption. Street lighting: 100-w. tungsten lamps; rate, 8 cents per k.w.h.

ALBERTA

BANKHEAD. Supplied from steam plant of Canadian Pacific Railway Co., Banff being also supplied. Plant mostly used for mining operations. **Steam Plant:** Frame buildings, 122 x 70 ft. and 189 x 70 ft.; contain nine 150-h.p. return tubular boilers at 120 lbs. pressure, also used to operate mining machinery installed in same buildings; two 500-h.p. compound condensing engines, each direct connected to a 150-k.v.a., 3-ph., 60-cy., 2,300-v. generator; three 75-k.v.a. station transformers, stepping voltage from 2,200 v. to 13,200 v. for transmission to Banff. **Transmission Line:** A transmission line, 6 mi. in length, operating at 13,200 v., 3 ph., 60 cy., extends from the power plant to Banff. **Banff substation:** Three 125-k.w. station transformers step voltage from 13,200 v. to 2,200 v. at 3 ph., 60 cy. **Distribution:** Including Bankhead and Banff, 12 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 230 v.; 28 line transformers, of 184 k.w. total capacity. Number of consumers, 472; connected load, 172 k.w. for lighting and 215 h.p. in motors. **Rates:** 11 cents per k.w.h. Street lighting: enclosed arc lamps, at $75 per lamp per year.

BANFF. Supplied from Bankhead power plant. See under Bankhead.

BASSANO (569). Supplied from gas-engine plant of S. C. Davy. **Power Plant:** Frame building, 32 x 60 ft.; contains one 100-h.p. gas engine, belted to a 62-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: natural gas; consumption, 12,000 cu. ft. per day. Maximum load, 46 k.w. Value of plant, $15,000. Night service only. Installed 1917, replacing plant in operation since 1912. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 21 line transformers, of 65 k.w. total capacity. Number of consumers, 200; connected load, 200 k.w. for lighting and 3 h.p. in motors. Value of distribution system, $8,000. **Rates:** 18 cents per k.w.h. Street lighting: 250-w. tungsten lamps, at $60 per lamp per year.

BELLEVUE. Supplied from steam plant of West Canadian Collieries, Ltd. Plant mainly used for mining operations. **Steam Plant:** Stone building, 175 x 41 ft.; contains eight 150-h.p. return tubular boilers, at 125 lbs. pressure; one 360-h.p. and one 290-h.p. engine, each belted to a 250-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: bituminous coal; consumption, 35 tons per day, at $2 per ton. Continuous service. Value of plant, $94,500. Cost of generation, $73 per h.p.-year. Installed 1908. **Distribution:** 3¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 8 line transformers, of 45 k.w. total capacity. Number of consumers, 113; connected load, 35 k.w. for lighting, exclusive of mining operation. Value of system, $2,695. **Rates:** Flat rate, 50 cents per 25-w. up to $1.25 per 100-w. lamp; meter rate, 15 cents per k.w.h. Street lighting: 60-w. and 100-w. lamps.

BLAIRMORE (1,219). Supplied under municipal control; obtained from steam plant of West Canadian Collieries, Ltd.; also used for mine operations. Amount purchased, 20 k.w., at 6 cents per k.w.h.

West Canadian Collieries, Ltd.—Steam Plant: Frame building, 20 x 50 ft.; contains two 150-h.p. return tubular boilers, at 115 lbs. pressure; one 100-h.p. engine, operating a 75-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: run-of-mine bituminous coal; consumption,

See page 12 for explanation of abbreviations used in this report.

NOTE—Except where otherwise stated, the statistics of population have been extracted from the Census of 1916.

† Population statistics with a dagger have been obtained from the municipality.

7 tons per day, at $3 per ton. Maximum load, including mine operation, 40 k.w. Continuous service. Value of plant, $40,000. Cost of generation, $120 per h.p.-year.

Municipal System—Distribution: 3 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 7 line transformers, of 58 k.w. total capacity. Number of consumers, 160. **Rates:** 10 cents per k.w.h. Street lighting: 250-w. lamps, at $47.62 per lamp per year.

BOWNESS (near Calgary). Supplies from gas-producer plant of Bowness Improvement Co.; mainly used for electric railway purposes. **Power Plant:** Brick building, 60 x 80 ft.; contains two 175-h.p. gas engines, each direct connected to a 117-k.v.a., 3-ph., 60-cy., 2,200-v. generator; one 200-k.w. motor-generator set, at 550-v. d.c. for electric railway. Fuel: natural gas; consumption, 750,000 cu. ft. monthly, at 17 cents per 1,000 cu. ft. Maximum load, 400 h.p. Continuous service. Cost of generation, including overhead charges, 1¾ cents per k.w.h. Installed 1914. **Distribution:** 6 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 15 line transformers, of 80 k.w. total capacity. Number of consumers, 12; connected load, 14 k.w. for lighting, 150 h.p. in motors and 20 k.w. in appliances. Value of distribution system, $14,000. **Rates:** Lighting, 10 cents per k.w.h., with a monthly minimum, less 10 per cent discount; power, 2 cents and upward, per k.w.h. Street lighting: 100-w. lamps.

CALGARY (56,514). Supplied, under municipal control, from two hydro-electric plants of the Calgary Power Co., and from a municipal steam plant; also by the hydro-electric and steam plants of the Calgary Water Power Co. The municipal system supplies in block for the distribution system in East Calgary village. See East Calgary.

Calgary Power Co. System—This system has two hydro-electric plants on Bow river, one at Horseshoe fall, 48 miles west of the city, and the other at Kananaskis fall, 1½ mi. west of the first plant. **Horseshoe Fall Hydro-electric Plant:** Concrete dam, 500 ft. long and 50 ft. high, with 4 iron penstocks, 2 of 9½ ft. and 2 of 12 ft. diam., 250 ft. long, leading to a concrete and brick power house 118 x 56 ft. Head utilized, 70 ft. Equipment: two 3,750-h.p. turbines, each direct connected to a 2,500-k.v.a. generator, and two 6,000-h.p. turbines, each direct connected to a 4,000-k.v.a. generator; energy at 3 ph., 60 cy., 12,000 v.; 2 independent exciter sets, of 175 k.w.; four 3,000-k.v.a. station transformers, each a 3-ph. unit, stepping voltage from 12,000 v. to 55,000 v. Value of plant, $2,000,000. Installed 1911. **Kananaskis Fall Hydro-electric Plant:** Concrete dam of 800 ft. total length, main or central section 174 ft. long and 50 ft. high, provided with eight 17-ft. and one 24-ft. opening between 3-ft. concrete piers. Water is led from pondage formed by dam through a canal 70 ft. wide and 650 ft. long to a forebay, thence through two concrete pipes, 13 ft. in diameter and 70 ft. long, to a concrete power house, 90 x 57 ft. Head utilized, 70 ft. Equipment: two 5,800-h.p. vertical turbines, each direct connected to a 3,750-k.v.a., 3-ph., 60-cy., 12,000-v. generator. Value of plant, $1,000,000. Installed 1913. The two power plants operate in conjunction, all energy for Calgary passing through the Horseshoe Fall plant. Total maximum demand on the two plants, 10,000 h.p. Average load factor, 92 per cent. Cost of generation for combined two plants, including overhead charges, 0·0958 cent per k.w.h. Shortage of water experienced at first now remedied to a certain extent by water storage in lake Minnewanka, difficulty being sometimes experienced in regulating flow and keeping water from freezing on way from storage to power plants, a distance of 30 mi. **Transmission Lines:** Energy transmitted from Kananaskis plant to Horseshoe plant at generator voltage of 12,000 v. At latter plant, portion is stepped up to 55,000 v. for transmission to Calgary, other portion transmitted at 12,000 v. to Exshaw. Two transmission lines extend from plant to Calgary, each 50 mi. in length; they operate at 55,000 v. and consist of 3 No. 0 aluminium conductors with pin-type insulators on wooden poles. Both lines can carry a total of 12,000 h.p. with 7½ per cent estimated loss. The single line to Exshaw is 8 mi. long; it operates at 12,000 v., and consists of 3 circuits each of 3 No. 00 aluminium cables with pin-type insulators on wooden poles; each circuit is designed to carry 4,000 h.p. with 4 per cent loss. Electrolytic arresters used on all lines for

lightning protection, also stranded steel ground wires over lines grounded every fifth pole. The amount of energy supplied from these various transmission lines is 5,000 h.p. to Calgary municipal system, 1,500 h.p. to Cement Company at Calgary, 3,500 h.p. to Cement Company at Exshaw and 50 h.p. at Cochrane. **Substations:** The company's Calgary terminal station contains three 3,000-k.v.a. station transformers, stepping voltage from 55,000 v. to 12,000 v., at which voltage the municipal substations are supplied; one 1,250-k.v.a. transformer, stepping voltage from 12,000 v. to 2,200 v. for the local distribution, and two 1,250-k.v.a. transformers, stepping voltage from 55,000 v. to 600 v. for the Cement Company, all energy at 3 ph., 60 cy.

Municipal System—A block of 5,000 h.p. is purchased from the Calgary Power Co., at $26 per h.p.-year at 12,000 v.; a municipal steam plant supplies additional energy; maximum load on the whole system 12,134 h.p. **Steam Plant:** Brick building, 310 x 133 ft.; contains 24 water-tube boilers, of 6,870 h.p. total capacity, in units of from 60 to 335 h.p.; 3 steam turbine units, of 6,250 k.v.a., 3,125 k.v.a. and 2,800 k.v.a., respectively, and one 1,100-h.p. compound condensing engine, direct connected to a 700-k.v.a. generator; energy from these 4 units at 3 ph., 60 cy., 2,200 v.; one 800-h.p. and one 1,000-h.p. compound condensing engine each direct connected to a 600-k.w., d.c. generator for electric railway service. Plant operated as auxiliary to supplement the purchased energy. Fuel: coal, at $3.75 per ton, and natural gas, at 15 cents per 1,000 cu. ft. Value of plant, $1,046,000; cost of generation from steam plant, 0·952 cent per k.w.h. Installed 1907. **Substations:** Four main substations and other smaller ones, stepping voltage from 12,000 v. to 2,300 v. at 3 ph., 60 cy., and 5 motor generator sets of 3,800 k.w. total capacity for electric railway service at 550 v., d.c. Output divided into 35 per cent lighting, 46 per cent power and 19 per cent electric railway. Load factor, 65 to 72 per cent. **Distribution:** 225 mi. of streets, with 4 mi. underground; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 1,582 line transformers, ranging from 0·6 k.w. to 150 k.w. Number of consumers, 14,219. Connected load in motors alone, 15,050 h.p. Value of distribution system, $1,462,000. **Rates:** Meter rate for lighting, 5 cents per k.w.h.; flat rate for lighting, 50 cents per 16-c.p. per month; appliances, 2 to 5 cents per k.w.h., according to restrictions; power, 1 cent to 2 cents per k.w.h. Street lighting: magnetite arc, inverted arc and a.c. enclosed arc lamps, at $60, $50 and $48 per lamp per year, respectively.

Calgary Water Power Co. System—Energy obtained from a hydro-electric and a steam plant, both in city. **Hydro-electric Plant:** On Bow river; wooden dam, 150 ft. long and 10 ft. high, with adjacent frame power house, 30 x 50 ft. Head utilized, 10 ft. Equipment: one 200-h.p., two 150-h.p. and four 70-h.p. turbine sets, belted to three 200-k.w., 3-ph., 60-cy., 2,200-v. generators; one 100-k.w. generator, at 1,000 v., not in use. Maximum load, full capacity of plant, but only used as auxiliary to steam; usually closed down during three of the winter months from shortage of water. Value of plant, $50,000. Installed 1892. **Steam Plant:** Frame and brick building, 36 x 66 ft., with boiler room 44 x 66 ft., contains two 250-h.p. and two 375-h.p. water-tube boilers, at 150 lbs. pressure; one 950-k.v.a. steam turbine unit: one 700-h.p. and one 450-h.p. compound condensing engine, direct connected, respectively, to a 500-k.w. and a 360-k.w. generator; all energy at 3 ph., 60 cy., 2,200 v. Fuel: 5,000 tons of coal per year, at $5 per ton. Maximum load, 1,400 k.w. Load factor, 75 per cent. Continuous service. Value of plant, $200,000. Cost of generation per k.w.h., 2 cents for steam plant and 1½ cents from combined steam and hydro-electric plants. First installation 1889, renewed since. **Distribution:** 16 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 300 line transformers, of 2,600 k.w. total capacity. Number of consumers, 2,500; connected load, 2,200 k.w. for lighting and 400 h.p. in motors. Value of distribution system, $50,000. **Rates:** Lighting, 4 to 5 cents per k.w.h., with a monthly minimum; power, 1 cent to 2 cents per k.w.h.

CAMROSE (1,692). Supplied from municipal steam plant. **Steam Plant:** Brick and concrete building, 30 x 90 ft.; contains two 150-h.p. return tubular boilers, at 156 lbs. pressure, which also supply steam for water-works equipment in same building; one 200-h.p.

and one 75-h.p. compound engine, direct connected, respectively, to a 125-k.w. and a 60-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: lignite coal; consumption, 3,000 tons per year, at $2.35 per ton. Maximum load, 100 k.w. Continuous service. Value of plant, including distribution system, $48,000. Cost of generation, 9 cents per k.w.h. Installed 1911. **Distribution:** 6 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 34 line transformers, of 265 k.w. total capacity. Number of consumers, 350; connected load, 175 k.w. for lighting, 120 h.p. in motors and 50 k.w. in appliances. **Rates:** Lighting, 10½ to 12 cents per k.w.h., less 5 per cent discount, with monthly minimum; power, 5 to 10 cents per k.w.h., with a monthly minimum. Street lighting: 40-w., 60-w. and 80-c.p. lamps, at rate of 10 cents per k.w.h.

CANMORE. Supplied from steam plant of Canmore Coal Co.; plant operated in connection with mines. **Steam Plant:** Frame buildings, 44 x 60 ft. and 37 x 46 ft., with concrete fire-wall, contain six 150-h.p. return tubular boilers, at 150 lbs. pressure, and two 350-h.p. compound condensing engines, each direct connected to a 260-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: bituminous coal; consumption, 43 tons per day, at $3.50 per ton. Maximum load, 390 k.w.; load factor, 66 per cent. Continuous service. Value of plant, $84,000. Cost of generation, 1¼ cents per k.w.h. Installed 1914. **Distribution:** 1½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. to 440 v.; 11 line transformers of 187 k.w. total capacity. Number of consumers, 29; connected load, 37 k.w. for lighting and 405 h.p. in motors. Value of distribution system, $4,500. **Rates:** 10 cents per k.w.h.

CARDSTON (1,370). Supplied from municipal steam plant. **Steam Plant:** Brick building, 49 x 77 ft., contains two 100-h.p. Robb-Mumford boilers, at 100 lbs. pressure, and one 75 h.p. engine, belted to a 75-k.w., 2-ph., 60-cy., 2,200-v. generator. Fuel: nut coal, at $4 per ton. Maximum load, 75 k.w. Night service only. Value of plant, $20,000. Installed 1907. **Distribution:** 5½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 25 line transformers, of 70 k.w. total capacity. Number of consumers, 280; connected load, 120 k.w. for lighting. Value of distribution system, $70,000. **Rates:** 10 to 14 cents per k.w.h. Street lighting: 60-w. lamps.

CARMANGAY (332). Supplied from municipal steam plant. **Steam Plant:** Metal-covered frame building, 20 x 30 ft., contains one 60-h.p. return tubular boiler and one 75-h.p. engine, operating a 50-k.w., 3-wire, d.c. generator at 110 v and 220 v. Fuel: Coleman bituminous coal, at $5 per ton. Maximum load, 40 k.w. Night service only. Value of plant, $7,000. Cost of generation, 15 cents per k.w.h. Installed 1912, replacing plant in operation since 1910. **Distribution:** 3½ mi. of streets, at 110 v. and 220 v., d.c. Number of consumers, 200; connected load, 50 k.w. for lighting. Value of distribution system, $12,000. **Rates:** 18 cents per k.w.h., with monthly minimum and meter rental. Street lighting: 200-w. nitro lamps.

CLARESHOLM (687). Supplied from municipal steam plant. **Steam Plant:** Frame building, 130 x 30 ft., contains two 100-h.p. return tubular boilers, at 140 lbs. pressure, and one 200-h.p. compound engine, direct connected to a 125-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: bituminous coal; consumption, 100 tons per month, at $4.85 per ton. Maximum load, 115 k.w. Night service only. Value of plant, $10,000. Installed 1909. **Distribution:** 10 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 22 line transformers, of 56 k.w. total capacity. Number of consumers, 200; connected load, 70 k.w. for lighting and 60 h.p. in motors. Value of distribution system, $10,000. **Rates:** 15 cents per k.w.h. Street lighting: 200-w. nitro lamps, at $18 per lamp per year.

COCHRANE (284). Supplied under municipal control, a block of 50 h.p. being purchased from Calgary Power Co. (see under Calgary), at $50 per h.p.-year. **Substation:** Two 100-k.v.a. station transformers step voltage from 55,000 v. to 2,200 v. at 3 ph., 60 cy. **Distribution:** 2½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 5 line

transformers, of 32 k.w. total capacity. Number of consumers, 50; connected load, 6½ k.w. for lighting and 13 h.p. in motors. Value of system, $6,800. **Rates:** Lighting, flat rate, 2 cents per watt per month; power, $1 per h.p. per month. Street lighting: 100-w. lamps, at $24 per lamp per year.

COLEMAN (1,559). Supplied from steam plant of International Coal and Coke Co., mainly used in connection with mine. **Steam Plant:** Masonry building, 133 x 73 ft., contains ten 150-h.p. return tubular boilers, at 120 lbs. pressure; one 945-k.v.a. steam turbine at 3 ph., 60 cy., 2,200 v., and two 495-h.p. engines, each direct connected to a 250-k.w., d.c., 250-v. generator. Fuel: steam coal; consumption, 16,000 tons per year, at $3 per ton. Maximum demand, 750 k.w., mostly for mining purposes. Load factor, 50 per cent. Continuous service. Value of plant, $83,300. Cost of generation, 2·18 cents per k.w.h. Installed 1904. **Distribution:** 3 mi. of streets or roads; primaries at 2,200 v. and secondaries at 147 v.; distribution also at 220 v., d.c.; one distribution transformer of 345 k.v.a. capacity. Number of consumers, 340; connected load, 75 k.w. for lighting and 1,128 h.p. in motors. Value of distribution system, $6,700. **Rates:** No energy sold. Street lighting: 5 enclosed arcs and twenty-three 100-w. tungsten lamps; total yearly charge, $750.

CORONATION (456). Supplied from municipal steam plant. **Steam Plant:** Brick building, 45 x 50 ft.; contains two 120-h.p. return tubular boilers, at 131 lbs. pressure; one 120-h.p. engine, direct connected to a 75-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: slack and lump coal; consumption, 700 tons of slack, at $2.90 per ton, and 200 tons of lump, at $6.50 per ton. Maximum load, 26 k.w. Night service only. Value of plant, including distribution system, $15,000. Installed 1914. **Distribution:** 4 mi. of streets, with ¼ mi. underground; primaries at 2,200 v. and secondaries at 110 v.; 9 line transformers, of 57 k.w. total capacity. Number of consumers, 140; connected load, 30 k.w. for lighting. **Rates:** 12 to 20 cents per k.w.h., less 10 per cent discount. Street lighting: 60-c.p. nitro lamps, at $21.30 per lamp per year.

DIDSBURY (640). Supplied from a municipal steam plant. **Steam Plant:** Cement-block building, 38 x 24 ft., contains two 100-h.p. return tubular boilers, at 125 lbs. pressure; one 100-h.p. engine, belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: steam coal; consumption, 600 tons per year at $5.20. Maximum load, 40 k.w. Night service only. Value of plant, $28,000. Cost of generation, 10 cents per k.w.h. Installed 1912. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 42 k.w. total capacity. Number of consumers, 140; connected load, 75 k.w. for lighting and 3 h.p. in motors. Value of distribution system, $12,000. **Rates:** Lighting, 15 to 22 cents per k.w.h.; power, 8 cents per k.w.h. Both rates subject to monthly minimum. Street lighting: 100-w. tungsten lamps, at $42.85 per lamp per year.

DRUMHELLER (312). Supplied from steam plant of Northwestern Engineering and Supply Co. **Steam Plant:** Metal-covered frame building, 46 x 44 ft., contains two 150-h.p. water-tube boilers and one 150-h.p. engine, belted to a 100-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal; consumption 5 tons per day, at $1.80 per ton. Maximum demand, 82 k.w. Night service only. Value of plant, $27,000. Installed 1916. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 27 line transformers, of 108 k.w. total capacity. Number of consumers, 312; connected load for motors alone, 21 h.p. Value of distribution system, $4,200. **Rates:** Lighting, 18 cents per k.w.h.; power, 10 cents per k.w.h. All rates subject to 10 per cent discount. Street lighting: 100-w. and 200-w. lamps, at $36 and $48 per lamp per year, respectively.

EAST CALGARY (village of) (200†). Supplied by Weno Power and Light Co.; obtained in block from the Calgary municipal system at 1 cent to 1·6 cents per k.w.h. **Distribution:** Including supply line from Calgary, 6½ mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 14 line transformers, of 200 k.w. total capacity. Number

of consumers, 25; connected load, 75 k.w. for lighting and 125 h.p. in motors. Value of distribution system, $15,000. **Rates:** Flat rate, 25 cents per 8-c.p. lamp per month; meter lighting rate, 10 cents per k.w.h.; meter power rate, 2½ cents per k.w.h.

EDMONTON (53,846). Supplied under municipal control; energy purchased at 1 cent per k.w.h. from Alliance Power Co., which is operating the municipal power plant under contract.

Alliance Power Co.—Company operates municipal steam plant. **Steam Plant:** Brick building, 143 x 256 ft., contains eight 400-h.p. and eight 500-h.p. water-tube boilers, 10 of these boilers equipped with automatic stokers; one 4,000-k.w. and two 2,000-k.w. steam turbine units; one 1,500-h.p. Corliss engine, direct connected to a 1,000-k.w. generator; energy at 3 ph., 60 cy., 2,300 v.; also two 400-k.w. and one 750-k.w. direct-connected units, supplying d.c. energy for electric railway purposes. Fuel: lignite coal; yearly consumption, 71,500 tons, at $1.22 per ton. Maximum load, 6,200 k.w. Yearly load factor, 34·4 per cent; output divided, 39 per cent for lighting, 27 per cent for power and 34 per cent for electric railway. Continuous service. Value of plant, $1,347,764. Cost of generation, including overhead charges, 0·7 cent per k.w.h. Installed 1914, replacing plant in operation since 1898. **Municipal System—Substation:** Supplied by special circuit at 6,600 v.; equipment includes two 500-k.w. synchronous motor generator units and two 1,000-k.w. station transformers, stepping voltage from 6,600 v. to 2,300 v. at 3 ph., 60 cy. Value of substation, $121,946. **Distribution:** 165 mi. of streets and roads, with 1½ mi. underground; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 572 line transformers, ranging from 0·6 k.w. to 100 k.w. Number of consumers, 11,400. Value of distribution system, $474,420. **Rates:** Lighting, 5·5 to 7 cents per k.w.h.; power and domestic appliances, 1·1 to 3 cents per k.w.h., both rates subject to monthly minimum and 10 per cent discount. Street lighting: magnetite arc lamps and tungsten lamps of 40 c.p. to 350 c.p., 729 of former and 777 of various size tungsten, at a total yearly cost of $59,858.

EXSHAW. Supplied in block by the Calgary Power Co. (see under Calgary) to the Canada Cement Co. for mill operation. Amount taken, 3,500 h.p. at $25 per h.p.-year. **Substation:** Six 700-k.v.a. station transformers step voltage from 12,000 v. to 600 v.

FORT SASKATCHEWAN (993). Supplied from municipal steam plant. **Steam Plant:** Frame building, 30 x 30 ft., contains one 100-h.p. boiler, at 125 lbs. pressure, and one 100-h.p. compound engine, belted to a 72-k.w., 2-ph., 66-cy., 2,200-v. generator. Fuel: lignite coal; consumption, 815 tons per year, at $2.95. Maximum load, 31 k.w. Night service only. Value of plant, $5,000. Cost of generation, 17½ cents per k.w.h. in summer and 8 cents per k.w.h. in winter. Installed 1906. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 8 line transformers, of 47 k.w. total capacity. Number of consumers, 160; connected load, 60 k.w. for lighting. **Rates:** 14 to 16 cents per k.w.h. Street lighting: 60-w. and 250-w. tungsten lamps, at $25.60 per 60-w. lamp per year, exclusive of renewals.

FRANK (622). Supplied from steam plant of Franco-Canadian Collieries, Ltd.; plant mainly used for mining operations. **Steam Plant:** Brick veneer building, 480 x 80 ft., contains four 250-h.p. water-tube boilers, at 160 lbs. pressure, and one 750-h.p. compound condensing engine, direct connected to a 475-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: run-of-mine coal; consumption, 40 tons per day, at $2. Maximum demand, 475 k.w. Continuous service. Value of plant, $100,000. Cost of generation, $30 per h.p.-year. Installed 1909. **Distribution:** Including system for mining operations, 2 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v. to 440 v.; 21 distribution transformers, ranging from 2½ k.w. to 50 k.w. Number of consumers, 200; connected load, 65 k.w. for lighting and 400 k.w. for power. Value of distribution system, $6,000. **Rates:** Flat rate, 60 cents per 25-w. and 40-w. tungsten lamp monthly. Street lighting, 100-w. tungsten lamps, at $24 per lamp per year.

GLEICHEN (591). Supplied from municipal steam plant. **Steam Plant:** Metal-covered frame building, 90 x 40 ft., also used in connection with water-works, contains two 100-h.p. return tubular boilers; one 40-h.p. engine, belted to an 11-k.w. and a 14-k.w., d.c. generator at 110 v. Fuel: bituminous and lignite coal; yearly consumption, 200 tons of bituminous, at $6.50, and 200 tons of lignite, at $3.50. Maximum load, 22 k.w. Night service only. Installed 1912. **Distribution:** 2½ mi. of streets, at 110 v., d.c. Number of consumers, 70. Value of distribution system, $5,000. **Rates:** Meter rate, 25 cents per k.w.h., with meter rental. Street lighting: 100-w. nitro lamps, at $43.20 per lamp per year.

HANNA (711). Supplied from steam plant of A. Lindstrom. **Steam Plant:** Frame building, 22 x 48 ft., contains one 100-h.p. return tubular boiler, at 100 lbs. pressure, and one 130-h.p. engine, direct connected to a 70-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: Drumheller nut and slack coal, at $2.50 per ton. Maximum load, 40 k.w. Night service only. Value of plant, including system of distribution, $18,000. Installed 1916. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 10 line transformers, of 50 k.w. total capacity. Number of consumers, 150; connected load, 70 k.w. for lighting. **Rates:** Meter rate, 18 cents per k.w.h.; flat rate, 80 cents per 40-w. lamp per month. Street lighting: 100-w. tungsten lamps, at $18 per lamp per year.

HARDISTY (357). Supplied from gas and oil-engine plant of Hardisty Electric Co. **Power Plant:** Frame building, 40 x 40 ft., on concrete foundation, contains a suction gas producer and one 50-h.p. gas engine and one 12-h.p. oil engine, operating, respectively, one 35-k.w. and one 8-k.w., d.c., 3-wire, 220-v. and 440-v. generator. Fuel: pea anthracite coal; consumption, 100 tons per year, at $13.25. Maximum load, 35 k.w. Night service only. Value of plant, $9,000. Installed 1917. **Distribution:** 1½ mi. of streets, at 220 v. and 440 v., 3 wire, d.c. Number of consumers, 55. Value of distribution system, $1,000. **Rates:** 20 cents per k.w.h. Street lighting: 60-w. and 100-w. lamps, at $30 and $36 per lamp per year, respectively.

HIGH RIVER (1,182). Supplied from municipal steam plant. **Steam Plant:** Brick building, 75 x 50 ft., contains three 75-h.p. return tubular boilers, at 110 lbs. pressure, and one 277-h.p. engine, direct connected to a 110-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: bituminous coal; consumption, 1,750 tons per year, at $4.35. Maximum load, 55 k.w. Continuous service. Value of plant, $14,885. Cost of generation, 6·8 cents per k.w.h. Installed 1906. **Distribution:** 10 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v.; 16 line transformers, ranging from 3 k.w. to 10 k.w. Number of consumers, 275; connected load, 50 k.w. for lighting. Value of distribution system, $22,623. **Rates:** Flat rate, 90 cents per 16-c.p. per month, according to uses; meter rate, 14½ to 18 cents per k.w.h. All rates subject to 20 per cent discount. Street lighting: 16-c.p., 32-c.p. and 60-w. tungsten lamps, at approximately $37 per 60-w. lamp per year.

HILLCREST. Supplied from steam plant of Hillcrest Collieries, Ltd.; plant operated mainly in connection with coal mining operations. **Steam Plant:** Concrete building, 150 x 48 ft., contains six 150-h.p. return tubular boilers; one 430-h.p. and one 150-h.p. engine, direct connected, respectively, to a 312-k.w. and a 100-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: coal; consumption, 30 tons per day, at $2. Maximum load, 200 k.w. Continuous service. Value of power plant, $31,000. Installed 1911. **Distribution:** 7 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v.; 22 line transformers, of 620 k.w. total capacity. Number of consumers, 125; connected load, 17 k.w. for lighting and 370 h.p. in motors, latter for mining operations. Value of distribution system, $7,000. **Rates:** Flat rate, 50 cents per month per 16-c.p. lamp. Street lighting: 60-w. tungsten lamps.

INNISFAIL (838). Supplied from municipal steam plant. **Steam Plant:** Brick building, 32 x 32 ft., contains one 100-h.p. return tubular boiler, at 125 lbs. pressure, and one 100-h.p. engine, belted to a 55-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: Bankhead pea coal;

consumption, 685 tons per year, at $3.75 per ton. Maximum load, 15 k.w. Night service only. Value of plant, $14,266. Installed 1912. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 33 k.w. total capacity. Number of consumers, 172. Value of distribution system, $6,734. **Rates:** Meter rate, 15 to 18 cents per k.w.h., less 10 per cent discount. Street lighting: 80-c.p. tungsten lamps, at $50 per lamp per year.

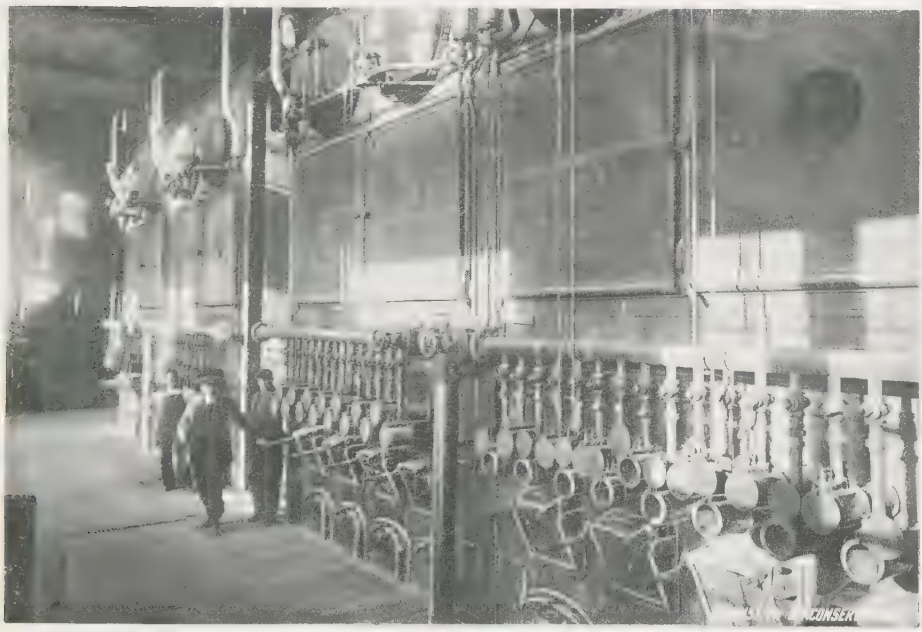
LACOMBE (1,047). Supplied from municipal hydro-electric and steam plants. **Hydro-electric Plant:** On Blindman river, near confluence with Red Deer river. Timber dam, 112 ft. long and 20 ft. high, with two short wooden flumes leading to frame power house, 18 x 28 ft. Head utilized, 22 ft. Equipment: one 100-h.p. turbine, belted to a 60-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 60 k.w. Trouble from shortage of water allows of plant operating only from March to September. Night service only. Value of plant, $8,000. Installed 1907. **Steam Plant:** Brick building, 40 x 40 ft., contains two 125-h.p. return tubular boilers, at 125 lbs. pressure, and one 155-h.p. engine, direct connected to a 100-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum demand, 60 k.w. Steam plant operated during six months of the year when hydro-electric plant is closed down. Fuel: egg coal; yearly consumption, 700 tons, at $3.25. Night service only. Value of plant, $14,000. Cost of generation, 10 cents per k.w.h. Installed 1910. **Distribution:** System is supplied both from hydro-electric plant and steam plant directly at 2,300 v. Exclusive of supply line from hydro-electric plant 8 mi. distant, system covers 4 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v.; 24 line transformers, of 93 k.w. total capacity. Number of consumers, 250; connected load, 125 k.w. for lighting. Value of distribution system, $7,500. **Rates:** 20 cents per k.w.h., less 10 to 40 per cent discount. Street lighting: enclosed arc lamps, at $75 per lamp per year.

LETHBRIDGE (9,436). Supplied from municipal steam plant. **Steam Plant:** Brick building, 116 x 88 ft., contains eight 280-h.p. water-tube boilers, at 160 lbs. pressure, equipped with automatic stokers and economizers; one 1,500-k.w. steam turbine unit, one 720-h.p. triple expansion condensing and one 440-h.p. compound condensing engine, direct connected, respectively, to a 500-k.w. and a 300-k.w. generator; all energy at 2 ph., 60 cy., 2,300 v. Maximum load, 1,210 k.w., with a load factor of 40 per cent. Output divided, 70 per cent for lighting and power and 30 per cent for electric railway. Fuel: local coal from mine owned by city; consumption, 11,250 tons per year, at $1.47. Continuous service. Value of plant, $600,000. Cost of generation, 1·18 cents per k.w.h.; including distribution, 3·45 cents per k.w.h. Installed 1910. A separate building is used for electric railway substation. Equipment: two 600-k.w. motor generators, supplying d.c. energy at 550 v. **Distribution:** 44 mi. of streets, with ¼ mi. underground; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 308 line transformers, ranging from 0·6 k.w. to 50 k.w. Number of consumers, 2,400. **Rates:** Lighting, 7 to 10 cents per k.w.h.; power meter rate, 2 to 6 cents per k.w.h., according to consumption and restrictions in use. All rates subject to 10 per cent discount. Street lighting: enclosed arc lamps, at a rate of 3 cents per k.w.h.

LLOYDMINSTER, Alta. (village of) (294). Supplied from Lloydminster, Sask., system. See under Lloydminster, Sask.

MACLEOD (1,811). Supplied from municipal steam plant. **Steam Plant:** Brick veneer building, 75 x 45 ft., also used for water-works purposes. Equipment, four 125-h.p. return tubular boilers, at 120 lbs. pressure; one 450-h.p. compound Corliss and one 180-h.p. simple engine, direct connected, respectively, to one 260-k.v.a. and one 110-k.v.a., 3-ph., 60-cy. 2,200-v. generator. Fuel: natural gas; consumption, 5,000 M. cu. ft. per month, at 17 cents. Maximum load, 225 k.w. Continuous service. Value of plant, $30,000. Installed 1907. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 44 line transformers, ranging from 5 k.w. to 10 k.w. Number of consumers, 450. Value of

CALGARY POWER CO.—HORSESHOE FALL HYDRO-ELECTRIC PLANT, 50 MILES WEST OF CALGARY, ALTA.



MUNICIPAL STEAM PLANT, MEDICINE HAT, ALTA.—BOILERS USING NATURAL GAS FUEL.

distribution system, $10,000. **Rates:** 15 cents per k.w.h. for power and lighting, less 10 to 25 per cent discount. Street lighting: 100-c.p. nitro lamps, at $22.50 per lamp per year.

MAGRATH (938). Supplied from steam plant of Crane-Cassidy Electric Co. **Steam Plant:** Stone building, 50 x 40 ft., contains one 100-h.p. return tubular boiler, at 100 lbs. pressure, and one 100-h.p. Corliss engine, belted to a 50-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: Hillcrest steam coal, at $5.50 per ton. Maximum demand, 22 k.w. Night service only. Value of plant, including distribution, but exclusive of boiler and engine, $20,000. Cost of generation, 15 cents per k.w.h. Installed 1917. **Distribution:** 8 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of 30 k.w. total capacity. Number of consumers, 127; connected load, 22 k.w. for lighting. **Rates:** 18 cents per k.w.h. Street lighting: 100-w. to 300-w. tungsten and nitro lamps, at $24 to $48 per lamp per year, respectively.

MEDICINE HAT (9,272). Supplied from municipal steam plant with gas-engine plant auxiliary. **Steam Plant:** Buildings, 90 x 48 ft. and 64 x 60 ft., contain four 400-h.p. water-tube boilers; two 750-k.v.a. and one 1,500-k.v.a. steam turbine units, at 3 ph., 60 cy., 2,300 v., and three 500-k.w. station transformers, stepping voltage up from 2,300 v. to 13,200 v. Fuel: natural gas; consumption, 60 cu. ft. per k.w.h., supplied from wells owned by city. Maximum load, 1,100 k.w.; load factor, 50 per cent. Output divided, 85 per cent for lighting and 15 per cent for power. Continuous service. Value of plant, including gas engines and equipment, $283,417. Cost of generation, 1·5 cents per k.w.h., including overhead charges Installed 1913. **Gas-engine Plant:** Installed in steam plant building; two 200-h.p., 4-cylinder gas engines, each direct connected to a 137-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: natural gas. Plant only used in emergencies. Installed 1911. **Transmission Line:** 13,200-v. line, 4 mi. in length, extends from power plant to a sub-station in the industrial district. **Substation:** Three 500-k.w. station transformers step voltage from 13,200 v. to 2,300 v. at 3 ph., 60 cy. **Distribution:** Primaries at 2,300 v. and secondaries at 110 v. to 550 v.; 144 line transformers, of 1,661 k.w. total capacity. Number of consumers, 1,500. Value of distribution system, including transmission line, $149,200. **Rates:** Lighting, 6 to 8 cents per k.w.h., less 10 per cent discount; power meter rate, 1 cent to 6 cents per k.w.h., less discounts up to 60 per cent for large consumption; power flat rate, $18 and upward per h.p.-year. Streets lighted with gas.

NANTON (590). Supplied from municipal combined steam and gas-engine plant. **Power Plant:** Brick veneer building, 30 x 60 ft., contains two 125-h.p. return tubular boilers, at 120 lbs. pressure; one 125-h.p. steam engine and one 75-h.p. gas engine; each engine may be direct connected, through flexible coupling, to the same 75-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: natural gas, at 17 cents per 1,000 cu. ft. Night service only. Value of power plant, $18,000. Installed 1910. **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 17 line transformers, of 80 k.w. total capacity. Number of consumers, 140; connected load, 40 k.w. for lighting and ½ h.p. in motors. Value of distribution system, $1,200. **Rates:** Lighting, 15 cents per k.w.h.; power, 10 cents per k.w.h. Street lighting: tungsten lamps, of from 60 w. to 200 w., at an average of $46 per lamp per year.

NORDEGG (800†). Supplied from steam plant of Brazeau Collieries, Ltd. Plant mainly used for mining operations. **Steam Plant:** Frame and metal-covered buildings, 36 x 30 ft. and 45 x 55 ft., contain four 150-h.p. return tubular boilers, at 150 lbs. pressure; two 230-h.p. engines, each direct connected to a 185-k.v.a., 60-cy., 2,300-v. generator. Fuel: run-of-mine coal; consumption, 6,000 tons per year, at $2.20. Maximum load, 370 k.w.; output divided, 3 per cent for lighting and 97 per cent for power. Load factor, 80 per cent. Continuous service. Value of plant, $70,000. Cost of generation, 4 cents per k.w.h. Installed 1914. **Distribution:** Including mining operations, 4 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v. and 440 v.; 32 line transformers, ranging from 2 k.w. to 50 k.w.

Number of consumers, 123. Value of distribution system, $12,500. **Rates:** Meter rate, 12 cents per k.w.h.; flat rate, 50 cents per lamp per month. Street lighting: 40-w. tungsten lamps.

OKOTOKS (525). Supplied from gas-engine plant of Okotoks Electric Co. **Power Plant:** Brick veneer building, 30 x 46 ft., contains one 80-h.p. gas engine, belted to a 37-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: natural gas; consumption, 7,000 cu. ft. per day, at 17 cents per 1,000 cu. ft. Maximum load, 30 k.w. Night service only. Value of plant, $11,000. Installed 1917. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 27 line transformers, of 59 k.w. total capacity. Number of consumers, 120; connected load, 32 k.w. for lighting and 7 h.p. in motors. Value of distribution system, $5,000. **Rates:** Meter rate, 18 cents per k.w.h., less 10 per cent discount, with monthly minimum. Flat rate, 75 cents to $1.30 per lamp per month, according to number, less 25 per cent discount. Street lighting: 100-w. tungsten and 200-w. nitro lamps, at $27 per 100-w. lamp per year.

OLDS (730). Supplied from producer-gas plant of Olds Electric Co. **Power Plant:** Frame building, 40 x 30 ft., contains one 150-h.p. gas producer and one 75-h.p., 2-cylinder gas engine, geared to a 35-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: Drumheller stove coal, at $2.50 per ton at mines; consumption, 2 lbs. per h.p.-hr. Maximum load, 28 k.w. Night service only. Value of power plant, $16,000. Installed 1917. **Distribution:** 5 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 24 line transformers, of 40 k.w. total capacity. Number of consumers, 145; connected load, 75 k.w. for lighting and 5 h.p. in motors. Value of distribution system, $8,000. **Rates:** Lighting, 18 cents per k.w.h.; power, 10 cents per k.w.h. Both rates subject to 10 per cent discount and a monthly minimum. Street lighting: 200-w. nitro lamps, at $54 per lamp per year.

OYEN (286). Supplied from steam plant of Peterson Motor Co. **Steam Plant:** Frame building, 32 x 24 ft., contains one 40-h.p. return tubular boiler, at 120 lbs. pressure, and one 30-h.p. engine, belted to a 20-k.w., 110-v., d.c. generator. Fuel: coal; consumption, 15 tons per month, at $7. Maximum demand, 22 k.w. Night service only. Value of plant including distribution system, $5,000. Installed 1918. **Distribution:** 3 mi. of streets, at 110 v., d.c. Number of consumers, 82. **Rates:** Flat rate, 2 to 2½ cents per watt. per month.

PINCHER CREEK (1,026). Supplied from municipal steam plant. **Steam Plant:** Brick building, 70 x 40 ft., contains one 100-h.p. and one 150-h.p. return tubular boiler, at 115 lbs. to 125 lbs. pressure; one 70-h.p. and one 210-h.p. engine, belted through countershaft and friction clutches to the same 120-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: steam slack coal; consumption, 650 tons per year, at $3.25 per ton. Maximum load, 35 k.w. Night service only. Value of plant, $27,000. Cost of generation, 6½ cents per k.w.h. Installed 1908. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 16 line transformers, ranging from 1 k.w. to 15 k.w. Number of consumers, 210, all for lighting. Value of distribution system, $5,000. **Rates:** 15 to 18¾ cents per k.w.h., less 20 per cent discount. Street lighting: 50-w. lamps, at $12 per lamp per year.

POCAHONTAS. Supplied from steam plant of Jasper Park Collieries, Ltd. ; mostly used for mining operations ; also supplying air compressor installed in plant and Miette mines, 2 mi. distant. **Steam Plant:** Reinforced concrete building, 114 x 48 ft., contains four 150-h.p. return tubular boilers, at 140 lbs. pressure ; one 150-h.p. and one 60-h.p. engine, direct connected, respectively, to a 185-k.w. and a 75-k.w., 3-ph., 60-cy., 480-v. generator. Energy partly distributed at 480 volts, partly stepped up to 2,280 v. through three 10-k.w. transformers for local distribution, and partly stepped up to 6,600 v. through three 10-k.w. transformers for transmission to Miette mines, 2 mi. distant. Fuel: slack coal; consumption, 4,000 tons per year, at $2. Maximum load, 175 k.w., divided, 7 per cent for lighting and 93 per cent for power. Value of plant, $70,000. Cost of generation, 3 cents per k.w.h.

Continuous service. Installed 1913. **Distribution:** 4¾ mi. of streets; primaries at 2,280 v. and 6,600 v. and secondaries at 110 v. to 480 v.; 22 line transformers, ranging from 2 k.w. to 10 k.w. Value of distribution system, $10,000. **Rates:** Monthly flat rate, 50 cents per lamp.

PONOKA (604). Supplied under municipal control. Energy obtained in block from provincial asylum steam plant, at 7 cents per k.w.h. **Steam Plant:** Brick building, 48 x 96 ft., contains two 150-h.p. return tubular and two 225-h.p. water-tube boilers, at 120 lbs. pressure; two 175-h.p. engines, each direct connected to a 125-k.w., 220-v., d.c. generator. Installation also comprises a 50-k.w. motor-generator unit to convert the d.c. energy to a.c. to supply the Ponoka distribution system at 3 ph., 60 cy., 2,200 v. Fuel: Pembina coal, at $2.50 per ton. Maximum demand, 88 k.w., including institution load. Continuous service. Installed 1910. **Distribution:** Including supply line from institution, 3 mi. of streets or roads; primaries at 2,200 v. and secondaries at 110 v.; 5 line transformers, of 30 k.w. total capacity. Number of consumers, 140; connected load, 40 k.w. for lighting and 5 k.w. in appliances. Value of distribution system, $4,550. **Rates:** 16 cents net per k.w.h., with meter rental. Street lighting: 100-w. lamps, at rate of 16 cents per k.w.h.

RAYMOND (1,205). Supplied from steam plant of Knight Sugar Co., in connection with flour mill. **Steam Plant:** Brick building, 40 x 55 ft., contains three 100-h.p. return tubular boilers, at 120 lbs. pressure, also used for mill engine; one 112-h.p. engine, direct connected to an 80-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: slack screenings; consumption, 600 lbs. per hour, at $1.50 per ton. Night service only. Maximum load, 30 k.w. Value of plant and distribution system, $18,000. Installed 1907, renewed since. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 18 line transformers, of 60 k.w. total capacity. Number of consumers, 225; connected load, 60 k.w. for lighting and 5 h.p. in motors. **Rates:** Meter rate, 14 cents per k.w.h.; monthly flat rate, from 40 cents per 25-w. to 80 cents per 60-w. lamp. Street lighting: 60-w. lamps, at $9.60 per lamp per year.

RED DEER (2,203). Supplied from steam plant of Western General Electric Co. **Steam Plant:** Frame building, 40 x 90 ft., with addition 30 x 50 ft., contains two 120-h.p. and one 200-h.p. Robb-Mumford boilers, at 110 lbs. to 125 lbs. pressure; one 125-h.p. simple and one 320-h.p. compound engine, belted and direct connected, respectively, to a 60-k.w. and a 260-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: Saunders Creek slack and nut coal; consumption, 275 tons per year, at $3.50. Maximum load, 120 k.w. Output divided, 91 per cent for lighting and 9 per cent for power. Yearly load factor, 24 per cent. Continuous service. Value of power plant, $50,000. Cost of generation, 6½ cents per k.w.h.; including distribution, 9¾ cents per k.w.h. Installed 1904, additions since. **Distribution:** 12 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 38 line transformers ranging from 2 k.w. to 15 k.w. Number of consumers, 380, of which 15 are for power. Value of distribution system, $30,000. **Rates:** Lighting, 20 cents per k.w.h., less discounts of from 5 to 44 per cent; power, 8 to 20 cents per k.w.h., less discounts of 20 to 50 per cent. Street lighting: a.c. arc lamps, at $125 per lamp per year.

STETTLER (1,168). Supplied from municipal steam plant. **Steam Plant:** Metal building, 30 x 80 ft., contains two 100-h.p. return tubular boilers and one 200-h.p. compound engine, direct connected to a 150-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel, coal; consumption, 2,300 tons per year, at $3.50. Continuous service. Value of power plant, $23,000. Cost of generation, 2·75 cents per k.w.h. Installed 1911. **Distribution:** 2 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 15 line transformers, of 620 k.w. total capacity. Number of consumers, 769; connected load, 120 k.w. for lighting and 115 h.p. in motors. Value of distribution system, $20,000. **Rates:** Lighting, 3 cents per k.w.h.; power, 4 cents per k.w.h. Street lighting: enclosed arc lamps.

TABER (1,412). Supplied by steam plant of Canada West Coal Co., operated mainly in connection with coal mining. **Steam Plant:** Concrete building, 50 x 97 ft., contains six

150-h.p. return tubular boilers, at 120 lb. pressure, and five compound engines of 900 h.p. total capacity, each ranging from 100 h.p. to 200 h.p.; engines are direct connected to four generators of 500 k.v.a. total capacity, and ranging from 27 k.v.a. to 150 k.v.a. Energy is generated both at 250 v., d.c., and at 3 ph., 60 cy., 2,300 v. Fuel: unmerchantable coal. Maximum load, 425 k.w., of which only 65 k.w. is used outside of mining operations. Cost of generation, $35 per h.p.-year. Continuous service. Installed 1906, additions since. **Distribution:** 14 mi. of streets and roads; primaries at 2,200 v., and secondaries at 110 v.; 16 line transformers, of 117 k.w. total capacity. Number of consumers, 275; connected load, 120 k.w. for lighting and 25 h.p. in motors. Value of distribution system, $35,000. **Rates:** 12 to 14 cents per k.w.h., with meter rental, less 5 per cent discount. Street lighting: 100-c.p. tungsten lamps, at $14.25 per lamp per year.

VEGREVILLE (1,156). Supplied from municipal steam plant. **Steam Plant:** Brick building, 40 x 50 ft., contains two 100-h.p. boilers, at 125 lbs. pressure; one 90-h.p. and one 120-h.p. engine, direct connected to a 62-k.v.a., and a 95-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal; consumption, 1,800 tons per year, at $2.00 per ton. Maximum load, 150 k.w. Continuous service. Value of power plant and distribution system, $29,000. Cost of generation, 5 cents per k.w.h. Installed 1915. **Distribution:** 4½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 15 line transformers, ranging from 3 k.w. to 15 k.w. Number of consumers, 240. **Rates:** 14 cents per k.w.h. Street lighting: 80-c.p. tungsten lamps, at $27 per lamp per year.

VERMILION (929). Supplied from steam plant of John Welsh. **Steam Plant:** Brick building, 40 x 60 ft., contains one 100-h.p. return tubular boiler, at 120 lbs. pressure, and one 75-h.p. compound engine, belted to a 50-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: coal; consumption, 1,000 tons per year, at $3.25. Night service only. Value of plant, $30,000. Installed 1912. **Distribution:** 5¼ mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v.; 9 line transformers, of 60 k.w. total capacity. Number of consumers, 175; connected load, 80 k.w. for lighting. Value of distribution system, $6,000. **Rates:** 15 cents per k.w.h. Street lighting: 100-w. tungsten lamps, at $43 per lamp per year.

VULCAN (415). Supplied from steam plant of Vulcan Electric Light Service. **Steam Plant:** Concrete building, 36 x 40 ft., contains one 100-h.p. and one 50-h.p. return tubular boiler, at 100 lbs. pressure, and one 75-h.p. engine, belted to a 62-k.v.a., 3-ph., 60-cy., 2,300-v. generator. Fuel: Crowsnest bituminous screenings, at $6.10 per ton. Night service only. Value of plant, including distribution system, $15,000. Installed 1917, replacing smaller plant. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 15 line transformers, of 75 k.w. total capacity. Number of consumers, 100; connected load, 75 k.w. for lighting and 12 k.w. in appliances. **Rates:** Meter rate, 15 to 18 cents per k.w.h., with meter rental and monthly minimum; flat rate, 75 cents per 25-w. lamp per month. Street lighting: 100-c.p. tungsten lamps.

WAINWRIGHT (818). Supplied from steam plant of Wainwright Light and Power Co. **Steam Plant:** Brick building, 28 x 50 ft., contains one 100-h.p. return tubular boiler and one 75-h.p. engine, belted to a 30-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: coal; consumption, 45 tons per month, at $2.25 to $4.00. Maximum load, 30 k.w. Night service only. Value of plant, $9,000. Installed 1917. **Distribution:** 5 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 9 line transformers, of 35 k.w. total capacity. Number of consumers, 135. Value of distribution system, $7,000. **Rates:** 15 to 17 cents per k.w.h., less 10 per cent discount. Street lighting: 60-c.p. to 250-c.p. nitro lamps, at $30 to $90 per lamp per year, respectively.

WETASKIWIN (2,048). Supplied, under municipal control, from combined steam and gas-engine plant. **Power Plant:** Two metal-covered frame buildings, each 38 x 42 ft., and brick boiler house, 50 x 43 ft. Equipment: one 250-h.p. gas producer (not used); two 150-h.p. and

one 100-h.p. return tubular boiler; one 190-h.p. gas engine; one 430-h.p. and one 120-h.p. compound engine, the first two direct connected, respectively, to a 127-k.w. and a 300-k.w. generator and the third belted to a 75-k.w. generator, all energy at 2 ph., 60 cy., 2,300 v. Fuel: natural gas; consumption, 70,000 cu. ft. per day, at $7 flat rate. Output divided, 57 per cent for lighting and 43 per cent for power. Average daily load factor, 32 per cent. Continuous service. Value of plant, $125,000. Cost of generation, 2·1 cents per k.w.h. First installation, 1904, additions since. **Distribution:** 7½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 32 line transformers, of 225 k.w. total capacity. Number of consumers, 399; connected load, 150 k.w. for lighting, 146 k.w. in motors and 3 k.w. for appliances. Value of distribution system, $21,000. **Rates:** Lighting, 12 cents per k.w.h.; power, 5 to 10 cents per k.w.h. All rates subject to 10 to 20 per cent discount. Street lighting: enclosed arc and 250-c.p. nitro lamps, at $18 and $12 per lamp per year, respectively.

BRITISH COLUMBIA

ALBERNI (500*). Supplied under municipal control, being obtained from Port Alberni system at 9 cents per k.w.h. (See Port Alberni). **Distribution:** 5 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 6 line transformers, ranging from 1¾ k.w. to 5 k.w. Number of consumers, 83; connected load, 33 k.w. for lighting. Value of distribution system, $7,568. **Rates:** 11 cents per k.w.h. Street lighting: 100-w. lamps, at $3.50 per lamp per year.

ANYOX (2,320†). Supplied from hydro-electric and auxiliary steam plant of Granby Consolidated Mining, Smelting and Power Co., practically entirely used for mining and smelting operations. **Hydro-electric Plant:** Water derived from Falls creek; rock-filled crib dam, 250 ft. long and 120 ft. high, with 6-ft. wood-stave pipe, 1·1 miles long, ending in a steel distributing penstock, 125 ft. long, leading to a brick power house, 180 x 50 ft., which also contains water-driven rotary blowers, blowing engine and air compressor, these having a total capacity of 4,325 h.p. Head utilized, 385 ft. Hydro-electric equipment: two pairs of impulse wheels, each pair of 1,400 h.p. total capacity, and direct connected to a 938-k.v.a., 3-ph., 60-cy., 2,200-v. generator; also two motor-generator units of 800 k.w. total capacity supplying 550 v., d.c. energy to electric locomotives. Total cost of plant, $600,000. Installed 1914. **Steam Plant:** Reinforced concrete building, 88 x 98 ft., contains five 575-h.p. water-tube boilers, at 175 lbs. pressure, also one 3,750-k.v.a. and one 2,500-k.v.a. steam turbine unit at 3 ph., 60 cy., 2,200 v. Fuel: crude oil, at 6·8 cents per gal. Value plant, $450,000. Installed 1917. Both plants operate in conjunction, the steam plant taking the greater portion of the load during winter months when shortage of water is felt. Maximum load on both plants, 5,000 k.w., of which 200 k.w. is for domestic service to employees. Load factor, 60 per cent. Cost of power from hydraulic plant, 0·25 cent per k.w.h.; from combined hydraulic and steam plants, 1·5 cents per k.w.h. **Distribution:** Including system for mining and smelting operations, 10 mi. of lines, primaries at 2,200 v. and secondaries at 110 v. to 440 v.; 150 distribution transformers, of 4,500 k.w. total capacity. Number of consumers for domestic use, 250; connected load, 250 k.w. for lighting, 9,000 h.p. in motors and 200 k.w. for heating. Value of distribution system, $200,000. **Rates:** No charges. Street lighting: 100-w. tungsten lamps, at $3.33 per lamp per year.

ARMSTRONG (950*). Supplied, under municipal control, from a combined hydro-electric and oil-engine plant. **Hydro-Electric Plant:** On Davis creek, 3 mi. distant. Stone-filled crib dam, 25 ft. long and 14 ft. high, with steel pipe, 12 to 14 and 16 inches diam. and ¾ mile long, leading to concrete power house, 30 x 40 ft. Head utilized, 550 ft. Equipment: one 150-h.p. impulse water wheel, direct connected to a 90-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 50 k.w. Continuous service when flow of water is sufficient; water shortage in February and March, when oil auxiliary plant is used to give night service only. Value of plant, including oil-engine auxiliary and distribution system, $75,000. Installed 1913. **Oil-engine Plant:** Installed in hydro-electric power house; one 200-h.p. Diesel oil engine, direct connected to a 150-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Plant used as auxiliary, as stated above. Fuel: crude oil; average yearly consumption, 4,000 gal., at 10 cents. Installed also in 1913. **Distribution:** 10 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 50 line transformers, of 250 k.w. total

See page 12 for explanations of abbreviations used in this report.

NOTE—Except where otherwise stated, the statistics of population have been extracted from the Census of 1911.

* Population statistics with an asterisk have been obtained from provincial statistics

† Population statistics with a dagger have been obtained from the municipality.

BRITISH COLUMBIA ELECTRIC RAILWAY CO.—COQUITLAM-BUNTZEN DEVELOPMENT, POWER PLANT ON NORTH ARM, BURRARD INLET, 16 MILES NORTHEAST OF VANCOUVER.—POWER HOUSE NO. 1 ON LEFT; POWER HOUSE NO. 2 ON RIGHT.

capacity. Number of consumers, 250; connected load, 125 k.w. for lighting and 75 h.p. in motors. **Rates:** Lighting, 10 to 15 cents per k.w.h.; power, 2 to 5 cents per k.w.h.; appliances, 2 to 8 cents per k.w.h. All rates subject to meter rental and monthly minimum.

ASHCROFT. Supplied from oil-engine plant of Ashcroft Water, Electric and Improvement Co. **Power Plant:** Frame building, 25 x 50 ft., contains one 50-h.p. and two 20-h.p. oil engines, belted to the same 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: crude oil; consumption, 30,000 gal. per year, at 6 cents per gal. Maximum load, 13 k.w. Night service only. Value of plant, $12,000. Cost of generation, 19 cents per k.w.h. Installed 1912. **Distribution:** 2 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 18 line transformers, of 90 k.w. total capacity. Number of consumers, 81; connected load, 20 k.w. for lighting. Value of distribution system, $15,000. **Rates:** 20 to 25 cents per k.w.h. Street lighting: 60-w. tungsten lamps; no charges.

BONNINGTON FALLS. See under Roseland and under Nelson.

BRITANNIA BEACH. Supplied by the Britannia Mining and Smelting Co., from a hydro-electric plant operated mainly in connection with copper mining and concentrating operations, water-power also used directly on air compressors, etc.; total water-power installation, 13,700 h.p.; water derived from Britannia and Furry creeks and plants operated under heads of from 600 ft. to 2,080 ft.; in some cases the total descent of 3,530 ft. is used in two steps of 1,450 ft. and 2,080 ft., respectively. Steam auxiliary plant also in connection. **Hydro-electric Plant:** Head works on Britannia creek at Tunnel dam, which is of concrete, 250 ft. long and 33 ft. high, with storage capacity of 2,650,000 cu. ft.; pipe line 17,460 ft. long, partly wood-stave and partly steel, 18 to 36 in. in diameter, leads to Beach power house, where head is 1,820 ft. At Furry creek, dam is of concrete, 207 ft. long and 77 ft. high, with storage capacity of 725,000 cu. ft.; water is led through a 7 x 5 ft. tunnel, 3,100 ft. long, and a pipe line, 17,470 ft. long, partly wood-stave and partly steel, from 28 to 60 in. in diameter, to Beach power house; head from this source, 740 ft. Beach power house is a frame building, 130 x 45 ft.; it contains two 3,750-h.p. Pelton wheels, each direct connected to a 2,500 k.v.a. generator, and operated from Tunnel dam pipe; one of the generators may also be operated from Furry creek; two 3,750-h.p. Pelton wheels, direct connected to one 2,500-k.v.a. generator and operated from Furry creek; all energy at 3 ph., 60 cy., 6,600 v. Maximum load, 6,500 h.p., of which a small portion is for domestic use. Extensive system of conservation storage n upper waters and branches; total reservoir capacity, 62,831,000 cu. ft. Estimated value of power plant, $1,350,000. Installed 1901, additions since. **Steam Plant:** Frame building, 170 x 100 ft., contains four 129-h.p. return tubular and four 500-h.p. water-tube boilers, at 125 to 160 lbs. pressure; one 2,000-k.w. and one 500-k.w. steam turbine unit, at 3 ph., 60 cy., 6,600 v., also 548 h.p. in air compressors. Fuel: crude oil used under boilers; consumption, 2,000,000 gal. per year. Plant used as auxiliary to water-power, but not expected to be used as much in future. Installed 1901, additions made since. **Distribution:** Including lines for mining operations, etc., 9 mi. of streets or roads, with 2 mi. underground; primaries at 6,600 v. and secondaries at 110 v. to 440 v.; 40 line transformers, of 250 k.w. total capacity, and 22 indoor transformers, of 4,550 k.w. total capacity. Number of consumers, 275; connected load, 75 k.w. for lighting, 5,000 h.p. in motors and 300 k.w. in appliances. **Rates:** 5 cents per k.w.h. Street lighting: 100-w. nitro lamps.

BURNABY. Supplied by British Columbia Electric Railway Co. See under Vancouver.

CASCADE. Supplied by West Kootenay Power and Light Co. See under Rossland.

CHASE (600†). Supplied from steam plant of Adams River Lumber Co.; operated mainly in connection with mill. **Steam Plant:** Steam obtained from mill boilers, which have a total capacity of 300 h.p. Equipment: two 75-h.p. engines, each belted to a 75-k.w. generator, one at 3 ph. and the other single ph., 125 cy., 1,100 v. Maximum load, 50 k.w. Night service only. Value of plant, including distribution system, $57,000. **Distribution:**

1 mi. of streets; primaries at 1,100 v. and secondaries at 110 v.; 18 line transformers, of 72 k.w. total capacity. Number of consumers, 100. **Rates:** Meter, 14 cents per k.w h.; flat, 45 cents net per 16-c.p. per month. Street lighting: 32-c.p. lamps; no charges.

CHILLIWACK (1,600*). Supplied by British Columbia Electric Railway Co. See under Vancouver.

CLAYBURN (200†). Supplied by Clayburn Co. Energy obtained in block from Western Power Company of Canada, mainly in connection with brick and tile works, but Clayburn Company sells to employees. **Distribution:** Secondaries at 110 v. Number of consumers, 25.

CLOVERDALE (250†). Supplied by British Columbia Electric Railway Co. See under Vancouver.

COAL CREEK (500†). Supplied by steam plant of Crows Nest Pass Electric Light and Power Co.; operated in connection with mines. **Steam Plant:** Steam supplied from a large battery of boilers used in connection with other operations. Equipment: two 300-h.p. engines, belted to four 100-k.w. and one 97-k.w., d.c., 250-v. generator. Fuel: low standard coal, at $1.60 per ton. Maximum load, 300 k.w.; output divided, 16 per cent for lighting and 84 per cent for power. Continuous service. Value of plant, $36,000. Cost of generation, 2·6 cents per k.w.h. Installed 1902. **Distribution:** 3½ mi. of streets, at 250 v., d.c. Number of consumers, 102. Value of distribution system, $8,000. **Rates:** Flat rate, 50 cents per lamp per month. Street lighting: enclosed arc, 500-w. nitro and 16-c.p. lamps; no charges.

COPPER MOUNTAIN (200†). Supplied from steam plant of British Columbia Copper Corporation, at Princeton, B.C.; operated practically entirely for mining purposes. **Steam Plant:** Four 105-h.p. return tubular boilers, at 160 lbs. pressure; one 650-h.p. compound engine, direct connected to a 500-k.v.a., 3-ph., 60-cy., 460-v. generator; three 150-k.w. station transformers, stepping voltage from 400 v. to 38,000 v. at 3 ph., 60 cy. Fuel: lignite coal, at $4.50 per ton. Maximum load, 400 k.v.a. Cost of generation, 2 to 2¼ cents per k.w.h. Continuous service. Installed 1911. **Transmission Line:** Operates at 38,000 v., 3 ph., 60 cy. Extends from Princeton to Copper Mountain, 13 mi. Power transmitted, 400 k.v.a., with 18 per cent estimated loss. Line consists of three conductors with pin-type insulators on wooden poles. Lightning protection, multigap arresters at each end. **Substation:** Three 150-k.w. transformers, stepping voltage from 38,000 v. to 550 v., and two of 150 k.w. stepping voltage from 550 v. to 2,200 v., at 3 ph., 60 cy. **Distribution:** 4 mi. of lines, with 1½ mi. underground; primaries at 2,200 v. and secondaries at 110 v. to 550 v.; 7 line transformers, of 71 k.w. total capacity; connected load, 30 k.w. for lighting and 472 h.p. in motors.

COURTENAY (500*). Supplied by Courtenay Electric Light, Heat and Power Co., a block of 50 k.v.a. being obtained from the Canadian Collieries, Ltd. (See under Cumberland). **Substation:** Outdoor type. One 50-k.w., single-ph. transformer, stepping voltage from 13,200 v. to 2,200 v. **Distribution:** 5 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 7 line transformers, of 44 k.w. total capacity. Number of consumers, 110; connected load, 40 k.w. for lighting, 16 h.p. in motors and 86 k.w. in ranges and appliances. **Rates:** Lighting, 7 to 14 cents per k.w.h., less 10 per cent discount; cooking, 5 to 7 cents per k.w.h.; power, 5 to 7 cents per k.w.h. Street lighting: 100-w. to 350-w. nitro lamps, at rate of 7 cents per k.w.h.

CRANBROOK (2,500*). Supplied from steam plant of Cranbrook Electric Light Co. **Steam Plant:** Brick building, 50 x 80 ft., contains three 105-h.p. return tubular boilers, at 160 lbs. pressure; one 400-h.p. and one 150-h.p. engine, direct connected and belted, respectively, to a 250-k.w., and a 75-k.w., 2-ph., 60-cy., 2,200-v. generator. Fuel: slack coal; consumption, 7 tons per day at $3.40. Maximum load, 93 k.w. Continuous service. Value

of plant, $110,000. Cost of generation, 8 cents per k.w.h. Installed 1910. **Distribution:** 15 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 43 line transformers, of 273 k.w. total capacity. Number of consumers, 550; connected load for power alone, 75 h.p. Value of distribution system, $75,000. **Rates:** Lighting, 18 cents per k.w.h., less 15 to 45 per cent discount. Power, 2½ to 10 cents per k.w.h. Street lighting: 25-w. to 250-w. tungsten lamps, at rate of 6 cents per k.w.h.

CUMBERLAND (1,200*). Supplied by Cumberland Electric Lighting Co. Obtained in block from Canadian Collieries Ltd.

Canadian Collieries Ltd. (Dunsmuir) System—Energy is obtained from hydro-electric plant on Puntledge river, 5 mi. northwest of Cumberland. Plant operated mainly in connection with coal mining operations, the transmission system supplying several mines and distribution systems, including Cumberland, Courtenay and Union Bay. **Hydro-electric Plant:** Impounding dam at outlet of Comox lake, of reinforced concrete, 300 ft. long and 20 ft. high; diversion dam, 1 mi. below latter, of reinforced concrete construction, 100 ft. long and 20 ft. high. Water led through wood-stave flume, 12 x 7 ft. section, 3,000 ft. long, to reinforced concrete forebay, thence through an 8-ft. to 6-ft. wood-stave penstock, branching into two 50-in. wood-stave and steel penstocks, a total distance of 2·6 mi. to concrete power house, 120 x 36 ft. Head utilized, 275 ft. Equipment: two 6,000-h.p. turbines, each direct connected to a 4,400-k.v.a., 3-ph., 25-cy., 13,200-v. generator. Maximum load, 3,700 k.w. Average monthly load factor, 81·7 per cent. Of the total output, 95 per cent is consumed in the operation of the company's mines and properties. Water storage is resorted to with Comox lake as a reservoir, no shortage of water being experienced. Value of plant, $813,435. Cost of generation, 0·13 cent per k.w.h. Continuous service. Installed 1913. **Transmission Lines:** Operate at 13,200 v. and extend to the various substations serving the mines, a total length of 26 mi. They consist of three No. 00 aluminium conductors on pin-type insulators and wooden poles. Substations supplied are situated at Nos. 4, 5, 7 and 8 mines, Lake Trail Road and Union Bay.

Cumberland Electric Lighting Co. System—Substation: System supplied from No. 5 mine substation. **Distribution:** 6½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 14 line transformers, of 190 k.w. total capacity. Number of consumers, 550; 5 of these use power. **Rates:** Lighting, 7 to 14 cents per k.w.h.; power, 5 to 7 cents per k.w.h. Street lighting: 100-c.p. to 250-c.p. nitro lamps, at rate of 7 cents per k.w.h.

DELTA. Supplied by British Columbia Electric Railway Co. See under Vancouver.

DUNCAN (800*). Supplied from municipal oil-engine plant. **Power Plant:** Brick building, 40 x 67 ft., contains two 100-h.p. Diesel oil engines, each direct connected to a 60-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil; consumption, 20,000 gal. per year, at 8 cents per gal. Maximum load, 50 k.w. Value of plant, including distribution system, $65,000. Continuous service. Installed 1914. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v. Number of consumers, 165. **Rates:** Lighting, 15 cents per k.w.h., less 20 per cent discount; power, 4 to 6 cents per k.w.h. Street lighting: 100-w. and 250-w. tungsten lamps.

ENDERBY (950*). Supplied from steam plant of Okanagan Saw Mills Ltd.; operated in connection with mill. **Steam Plant:** Installed in mill power plant. Steam supplied from the mill boilers, comprising six return tubular units of 424 h.p. total capacity, at 135 lbs. pressure. Equipment: one 100-h.p. engine, belted to a 75-k.w., single-ph., 60-cy., 2,300-v. generator. Fuel: mill refuse and slab wood; consumption of latter, 10 cords per 12 hours at $2.25 per cord. Maximum load, 75 k.w. Night service only. Value of plant, $4,000. Cost of generation, 7 cents per k.w.h. Installed 1907. **Distribution:** 15 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 31 line transformers, ranging from 1 to 15 k.w. Number of consumers, 169. Value of distribution system, $8,150. **Rates:** 12 to 14 cents per k.w.h. Street lighting: 60-w. tungsten lamps, at $7.20 per lamp per year.

ESQUIMALT. Supplied by British Columbia Electric Railway Co. See under Victoria.

FERNIE (3,146). Supplied from municipal steam plant. **Steam Plant:** Concrete building, 96 x 48 ft., contains three 105-h.p. return tubular boilers, at 100 lbs. pressure, and one 250-h.p. engine, belted to a 150-k.w., 2-ph., 66-cy., 2,400-v. generator. Fuel: slack coal; consumption, 2,334 tons per year, at $3.52. Maximum demand, 150 k.w. Yearly load factor, 29 per cent. Continuous service. Value of plant, $44,000. Cost of generation, 6·18 cents per k.w.h. Installed 1909. **Distribution:** 7 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 42 line transformers, ranging from 2½ k.w. to 15 k.w. Number of consumers, 600; connected load, 100 k.w. for motors alone. Value of distribution system, $30,000. **Rates:** Lighting, 13 cents per k.w.h.; power, 12 cents and downward per k.w.h. Street lighting: enclosed arc and 100-c.p. nitro lamps, at rate of 8 cents per k.w.h.

FRASER MILLS (900*). Supplied by steam plant of Canadian Western Lumber Co.; operated mainly in connection with mills. **Steam Plant:** Steam is supplied from mill boilers, which comprise sixteen 104-h.p. return tubular units; one 1,500-k.w. and one 750-k.w. turbine unit, energy at 3 ph., 60 cy., 480 v.; three 35-k.w. and three 40-k.w. transformers, stepping energy to both 1,150 v. and 2,300 v. Fuel: mill refuse. Maximum load, 1,750 k.w., mainly for mill operations. Continuous service. Installed 1910. **Distribution:** 1 mi. of streets; primaries at 1,150 v. and 2,300 v. and secondaries at 110 v. to 440 v.; 14 line transformers, of 200 k.w. total capacity. Number of consumers, 118; connected load, 60 k.w. for lighting and 3,000 h.p. for mill motors. Value of distribution system, $1,500. **Rates:** No specific rates, practically all consumers being employees of company. Street lighting: 100-w. nitro lamps.

GOLDEN (900†). Supplied from steam plant of Golden Light, Power and Water Co. Operated mainly in connection with lumber mill of Columbia River Lumber Co. **Power Plant:** Installed in mill, steam supplied from mill boilers, of 680 h.p. total capacity, at 130 lbs. pressure. Equipment: one 1,000-k.w. steam turbine unit at 480 v.; one 90-h.p. and one 60-h.p. engine, each belted to a 75-k.w., 2,300-v. generator; all energy at 3 ph., 60 cy.; two 25-k.w. station transformers, stepping voltage from 480 v. to 2,300 v. Load for outside distribution only, 50 k.w. Fuel: mill refuse. Night service only. Installed 1907, replacing previous plant. **Distribution:** 4 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 12 line transformers, of 72 k.w. total capacity. Number of consumers, 120. **Rates:** Monthly flat rate, 70 cents to $1 per 50-w. lamp. Street lighting: 25-w. lamps, at $15 per lamp per year.

GRAND FORKS (1,700†). Supplied under municipal control; purchased in block from West Kootenay Power and Light Co. (see under Rossland), at 1·5 cents per k.w.h. **Distribution:** 10 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 65 line transformers, ranging from 6 k.w. to 10 k.w. Number of consumers, 400, with 13 for power. Value of distribution system, $25,000. **Rates:** Meter lighting, 5 to 13 cents per k.w.h.; appliances, 4 cents per k.w.h.; power, 4 to 5 cents per k.w.h.; flat lighting rate, 75 cents per 60-w. lamp per month. Street lighting: 60-c.p. to 200-c.p. nitro lamps, at $2.40 to $7.20 per lamp per year, respectively.

GREENWOOD (778). Supplied from hydro-electric plant of Greenwood City Waterworks Co., on Boundary creek, 3 mi. distant. Also supplied by West Kootenay Power and Light Co., for mining purposes. (See Rossland). **Hydro-electric Plant:** Wooden and concrete dam, 40 ft. long and 60 ft. high, with 2½-ft. wood-stave pipe, ¼ mi. long, leading to concrete power house, 25 x 25 ft. Head utilized, 150 ft. Equipment: one 150-h.p. impulse wheel, direct connected to a 120-k.w., 3-ph., 60-cy., 4,400-v. generator. Maximum load, 85 k.w. Slight trouble from low water in winter. Continuous service. Value of plant, $85,000. Installed 1908. **Distribution:** 8 mi. of streets; primaries at 4,400 v. and secondaries at 110 v. and 220 v.; 20 line transformers, of 75 k.w. total capacity. Number of

GRANBY CONSOLIDATED MINING, SMELTING AND POWER CO.—HYDRO-ELECTRIC PLANT AT ANYOX, OBSERVATORY INLET, B.C.

CANADIAN COLLIERIES (DUNSMUIR)—HYDRO-ELECTRIC PLANT ON PUNTLEDGE RIVER, 5 MILES FROM CUMBERLAND, VANCOUVER ISLAND, B.C.

consumers, 150; connected load, 50 k.w. for lighting and 12 h.p. in motors. Value of distribution system, $15,000. **Rates:** Monthly flat rate, 50 cents per lamp; meter rate, 9 to 13 cents per k.w.h., with meter rental and monthly minimum. Street lighting: 200-w. and 40-w. lamps, at $12 per 40-w. per year.

HEDLEY (500†). Supplied from hydro-electric plant of Hedley Gold Mining Co., on Similkameen river, 3½ mi. distant; used principally in connection with mining operations. Company also has a combined auxiliary hydro-electric and steam plant in Hedley. **Similkameen Hydro-electric Plant:** Concrete pier, stop-log type dam, 20 ft. high and 260 ft. long, whence water is led through a flume, 9 x 7 ft. section, 2·8 mi. long, and an 8-ft. steel penstock, 65 ft. long, to frame power house, 26 x 48 ft. Head utilized, 67 ft. Equipment: one 2,100-h.p. turbine, direct connected to a 1,250-k.v.a., 3-ph., 60-cy., 6,600-v. generator. Maximum load, 1,600 h.p. Load factor, 85 per cent. Continuous service. Value of plant, $192,000. Installed 1914. **Transmission Line:** extends from Similkameen plant to Hedley. Operates at 6,600 v.; 3½ mi. in length. Consists of a single circuit of three No. 00 copper conductors, with pin-type insulators on wooden poles. Lightning protection, electrolytic arresters at each end. **Substation:** Three 400-k.w. transformers step voltage from 6,600 v. to 2,200 v. Load divided, 1,450 h.p. for mining and milling operations and 50 h.p. for town distribution. **Combined Hydro-electric and Steam Plant:** On Twenty-mile creek; hydro-electric capacity, 500 h.p., steam capacity, 500 h.p., mainly used for operating air compressor. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 7 line transformers, ranging from 2 k.w. to 10 k.w. Number of consumers, 90. Value of distribution system, $2,000. **Rates:** Monthly flat rate, 60 cents per 16 c.p. Meter rate, 15 cents per k.w.h.

HUNTINGDON (73†). Supplied mainly by British Columbia Electric Railway Co. (see under Vancouver), a few consumers also being supplied by Sumas Electric Co. as a portion of Sumas, Wash. system. **Rates:** 10 cents per k.w.h., less 10 per cent discount, with a monthly minimum.

KAMLOOPS (4,500*). Supplied from a municipal hydro-electric and a steam auxiliary plant. **Hydro-electric Plant:** On Barrière river, 40 mi. north of city. Rock-filled crib dam, 260 ft. long and 12 ft. high; water led through timber flume, 5 x 8 ft. section, 3·4 mi. long, and two 42-in. wood-stave pipes, 500 ft. long, to concrete power house, 50 x 46 ft Available head, 190 ft. Equipment: two 1,200-h.p. turbines, each direct connected to a 750-k.v.a., 3-ph., 60-cy., 2,200-v. generator; three 500-k.v.a. station transformers, stepping voltage from 2,200 v. to 44,000 v. at 3 ph., 60 cy. Maximum load, 2,000 h.p. Load factor, 60 per cent. Trouble mainly from ice. Continuous service. Value of plant, $240,000. Cost of generation and transmission, 3 cents per k.w.h. Installed 1913. **Transmission Line:** Operates at 44,000 v., 3 ph., 60 cy.; extends from power plant, following North Thompson river, to Kamloops. Total length, 42 mi., can transmit 5,000 h.p. at about 20 per cent loss. Wood-pole construction, with pin-type insulators. Lightning protection, ground wire over line. Supplies Kamloops and a substation about half way for irrigation. Value of line, $70,000. **Substation:** Three 500-k.w. transformers, stepping voltage from 44,000 v. to 2,200 v. at 3 ph., 60 cy. Maximum load for Kamloops, 750 k.w., divided 63 per cent for lighting and 37 per cent for power. Load factor, 24 per cent. **Steam Plant:** Concrete building, 96 x 75 ft.; contains four 250-h.p. water tube boilers and two 900-k.w. steam turbine units at 3 ph., 60 cy., 2,200 v. Fuel: Nicola Valley coal, at $4.20 per ton. Plant only used as auxiliary to hydro-electric. Installed 1912. **Distribution:** 17 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 180 line transformers, of 525 k.w. total capacity. Number of consumers, 1,150, with 45 for power. Value of distribution system, $100,000. **Rates:** Lighting, meter, 7 to 13 cents net per k.w.h.; lighting, flat, $2 per 16-c.p. per month, less 20 per cent discount; power, 1¼ to 6 cents per k.w.h., with a yearly fixed charge of $6 per h.p.-year; flat, for small motors, $60 per h.p.-year. Street lighting: arc, 100-c.p. nitro and 60-w. tungsten lamps, of 65 k.w. total capacity, at a total charge of $7,500 per year.

KASLO (722). Supplied from municipal hydro-electric plant, situated on Kaslo river immediately outside of the town. **Hydro-electric Plant:** Concrete dam, 10 feet high and 60 ft. long, with a forebay formed by rock-filled crib work, whence water is led through a 42 in. wood-stave pipe, 1,100 ft. long, to frame power house on concrete foundation, 40 x 60 ft. Head utilized, 41 ft. Equipment: one 250-h.p. turbine, belted to a 120-k.w. 2-ph., 60-cy., 1,100-v. generator. Maximum load, 135 k.w.; output divided, 44 per cent for lighting and 56 per cent for power. Trouble from low water, ice and flood water. Continuous service. Value of plant, $27,500. Cost of generation, $75 per h.p.-year. Installed 1897. **Distribution:** 4 mi. of streets; primaries at 1,100 v. and secondaries at 110 v. and 220 v.; 14 line transformers, ranging from 3 k.v.a. to 15 k.v.a. Number of consumers, 225; connected load, 50 k.w. for lighting, 83 h.p. in motors and 20 k.w. in appliances. Value of distribution system, $4,000. **Rates:** Lighting, meter rate, 15 cents per k.w.h.; lighting, flat rate, 1 cent per watt per month; appliances, 3 cents per k.w.h.; power, 1¼ to 4 cents per k.w.h., plus yearly fixed charge of $6 per h.p. Street lighting: 60-w. tungsten lamps, at $17.15 per lamp per year.

KELOWNA (2,500*). Supplied from municipal steam plant. **Steam Plant:** Reinforced concrete building, 37 x 88 ft.; contains three 80-h.p. return tubular boilers, at 120 lbs. pressure; one 325-h.p., one 200-h.p. and one 95-h.p. compound engine, direct connected, respectively, to a 250-k.v.a., a 100-k.v.a. and a 50-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: cordwood, slabs, coal and sawdust ; yearly consumption, 1,554 cords of wood and slabs at cost of $5,099, 363 tons of coal at cost of $2,097, and sawdust to the value of $2,300. Maximum load, 195 k.w. Output divided, 70 per cent for lighting and 30 per cent for power. Average load factor, 14·6 per cent. Continuous service. Value of plant, $30,800. Cost of generation, 6 cents per k.w.h. Installed 1908. **Distribution:** 14 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 74 line transformers, ranging from 0·5 k.w. to 15 k.w. Number of consumers, 525; connected load, 202 k.w. for lighting and 117 h.p. in motors. Value of distribution system, $28,363. **Rates:** Lighting, 18 cents per k.w.h. Power, 3 to 12 cents per k.w.h. All rates subject to 33⅓ per cent discount, with monthly minimum and meter rental. Street lighting: 80-c.p. and 400-c.p. nitro lamps, at rate of 8 cents per k.w.h.

LADYSMITH (3,000*). Supplied from municipal steam plant. **Steam Plant:** Concrete and metal-covered frame building, 35 x 35 ft., contains one 109-h.p. return tubular boiler, at 160 lbs. pressure, and one 125-h.p. compound engine, direct connected to a 115 k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: pea coal; consumption, 50 tons per month, at $4. Maximum load, 63 k.w. Service, 14 hours per day. Value of plant, $20,000. Installed 1909. **Distribution:** 15 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 15 line transformers, of 115 k.w. total capacity. Number of consumers, 425; connected load, 80 k.w. for lighting. Value of distribution system, $10,000. **Rates:** Lighting, 13 cents per k.w.h.; heating, 8 cents per k.w.h.; monthly flat rate for lighting, 1 cent to 1¼ cents per watt per month. Street lighting: 60-c.p. and 100-c.p. lamps, at $28 per 100-c.p. per year.

LANGLEY. Supplied by British Columbia Electric Railway Co. See under Vancouver.

MERRITT (703). Supplied from municipal steam plant. **Steam Plant:** Building, 40 x 60 ft., contains two 107-h.p. return tubular boilers, at 140 lbs. pressure; one 200-h.p. compound engine, direct connected to a 125-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: run-of-mine and slack coal; consumption, 5 tons per day, at $3.50 for former and $1.75 for latter. Maximum load, 125 k.w., divided, 28 per cent lighting and 72 per cent power. Service, 16 hours per day. Value of power plant, $25,000. Installed 1913. **Distribution:** 8 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 18 line transformers, of 127 k.w. total capacity. Number of consumers, 300; connected load, 35 k.w. for lighting and 90 h.p. in motors. Value of distribution system, $15,000. **Rates:** Lighting, 15 cents net per k.w.h.; power, 7 cents net per k.w.h. Street lighting: 250-c.p. nitro lamps, at $55.55 per lamp per year.

MICHEL (1,100†). Supplied from steam plant of Crows Nest Pass Electric Light and Power Co.; used mainly in connection with mining operations. **Steam Plant:** Brick building, 39 x 68 ft.; steam obtained from battery of boilers used in connection with mining operations, at an average flat rate of $20 per month. Equipment: two 400-h.p. compound engines, each direct connected to a 250-k.w., d.c., 250-v. generator. Fuel: low standard coal, at $1.60 per ton. Maximum load, 264 k.w.; output divided, 43 per cent for lighting and 57 per cent for power. Value of plant, $39,000. Cost of generation, 2·6 cents per k.w.h. Installed 1908. **Distribution:** 1 mi. of streets, at 250 v., d.c. Number of customers, 81; connected load, 55 k.w. for lighting and 180 k.w. in motors. Value of distribution system, $4,000. **Rates:** 13 cents per k.w.h. Street lighting: 16-c.p. lamps.

MILL CREEK. Supplied from hydro-electric plant of Whalen Pulp and Paper Mills, Ltd., on Mill creek, Howe sound, near mouth; operated in connection with mill. **Development:** Stone-filled crib dam, 30 ft. long and 12 ft. high, with 27-in. wood-stave and steel pipe, 1 mi. long, leading to power plant. Head utilized, 600 ft. Total hydraulic installation, 2,000 h.p., with an additional 2,000 h.p. deriving power from Cedar creek. Hydro-electric installation operated from Mill Creek pipe; one 300-h.p. turbine, direct connected to a 200-k.w., d.c., 125-v. generator. Maximum load, 200 k.w., mostly used in mill. Continuous service. Installed 1911. **Distribution:** 1 mi. of streets, at 125-v., d.c Number of consumers, 50; connected load, 30 k.w. for domestic lighting alone. **Rates:** Service charge as part of rent of dwellings. Street lighting: 100-w. lamps: no charge.

MISSION (797†). Large portion of city supplied by Western Power Co. of Canada (see under Vancouver); also supplied by Mission Water, Light and Power Co.

Mission Water, Light and Power Co. System—Hydro-electric Plant : Water derived from Silver creek; concrete and crib work dam, 150 ft. long and 25 ft. high; 16 in. wood-stave pipe, 3 mi. long, used for water supply and power plant. Head utilized, 125 ft. Equipment: one 70-h.p. turbine, direct connected to a 55-k.v.a., 3-ph., 60-cy., 250-v. generator. Maximum load, 30 h.p. Continuous service. Installed 1898. **Distribution:** 1 mi. of streets; two transformers, of 50 k.w. total capacity, step voltage from 220 v. to 110 v. for secondary distribution. Number of consumers, 60; connected load, 30 k.w. for lighting and 10 h.p. in motors. Value of distribution system, $2,000. **Rates:** Meter, 10 cents per k.w.h., with a monthly minimum, less 10 per cent discount; flat rate, 33 cents per lamp per month. Street lighting: 60-w. lamps, at $21 per lamp per year.

NANAIMO (8,000†). Supplied from combined hydro-electric and steam plant of Nanaimo Electric Light and Power Co. **Hydro-electric Plant:** On Millstone river; rock-filled crib dam 150 ft. long and 12 ft. high. Water led through ditch, 700 ft. long, and wooden flume, 2,000 ft. long, to balancing reservoir, thence through 30-in. wood-stave pipe, 2,500 ft. long, to brick power house, 40 x 70 ft. Head utilized, 160 ft. Equipment: one 450-h.p. impulse wheel, belted to a 150-k.w. and a 200-k.w., 3-ph., 60-cy., 2,300-v. generator. Shortage of water in summer, remedied to a certain extent by storage in artificial lake of 200 acres, with earth dam. Steam plant used as auxiliary during water shortage. Hydraulic plant installed 1904. Continuous service. Maximum load, 410 k.w.; yearly load factor, 34 per cent. **Steam Plant:** Boilers in adjoining metal building, 40 x 20 ft.; two 109-h.p. return tubular units; generating equipment, installed in same building as hydraulic; 450-h.p. compound engine, direct connected to a 300-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: pea coal; yearly consumption, 1,400 tons, at $3.15. First installation, 1895, renewed 1913. Value of combined plant and distribution system, $375,000. **Distribution:** 17 mi. of streets and roads; primaries at 2,300 v. and secondaries at 115 v.; 110 line transformers, ranging from 1 k.w. to 25 k.w. Number of consumers, 1,800; connected load, 1,450 k.w. for lighting and 140 h.p. in motors. **Rates:** Lighting, 7 to 14 cents per k.w.h., less 10 per cent discount; power, 3 to 8 cents per k.w.h. Street lighting: magnetite arc lamps, at $50 per lamp per year.

NARAMATA (200†). Supplied from hydro-electric plant of Okanagan Securities, Limited. **Hydro-electric Plant:** Water derived from Mill creek; wooden and concrete dam, 25 ft. long and 10 ft. high, with a 10-inch wood-stave pipe, 2 mi. long, leading to power plant, which is installed in hotel. Head available, 250 ft. Equipment: one 60-h.p. turbine, direct connected to a 20-k.w., single-ph., 2,200-v. generator. Value of plant, $3,000. Installed 1910. Intermittent night service. Plant sometimes forced to shut down temporarily, owing to requirements of irrigation. **Distribution:** 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 4 line transformers. Number of consumers, 15. Value of distribution system, $2,000. **Rates:** Flat, 50 cents per lamp per month. Street lighting: 60-w. lamps; no charges.

NELSON (4,476). Supplied from municipal hydro-electric plant at Upper Bonnington falls, Kootenay river. **Hydro-electric Plant:** Concrete dam or forebay wall, 30 ft. high and 267 ft. long, with 4 steel 6½-ft. penstocks, 60 ft. long. Head utilized, 54 to 62 ft. Equipment: one 1,600-h.p. and one 1,800-h.p. vertical turbine, connected, respectively, to a 750-k.w. and 1,000-k.w., 3-ph., 60-cy., 12,000-v. generator. Maximum load, 1,500 k.w., divided, 42 per cent for lighting, 40 per cent for power and 18 per cent for electric railway. Load factor, 60 per cent. Continuous service. Value of plant, $300,000. Cost of generation, 2¼ cents per k.w.h. Installed 1907. **Transmission Line:** Operates at 12,000 v., 3 ph., 60 cy.; extends from plant to Nelson, 11 mi., and consists of two circuits of three aluminium conductors, with pin-type insulators on wooden poles. Substations at Nelson and Granite supplied. **Substations:** At Nelson, six 250-k.w. transformers step voltage from 12,000 v. to 2,200 v. at 3 ph., 60 cy. At Granite, three 25-k.w. transformers step voltage from 13,000 v. to 2,200 v., 3 ph., 60 cy. **Distribution:** Including Granite, where energy practically all for power, 25 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 945 line transformers, ranging from 2½ k.w. to 25 k.w. Number of consumers, 1,400; connected load, 600 k.w. for lighting and 575 k.w. in motors. Value of distribution system, $48,606. **Rates:** Meter rate for lighting, 7 to 9 cents per k.w.h. Power, 2 to 4 cents per k.w.h. Street lighting: 60-w. tungsten lamps, at $3.20 per lamp per year.

NEW DENVER (300†). Supplied from plant of Denver Light and Power Co.; system also supplies Silverton. **Hydro-Electric Plant:** On Carpenter creek, 2 mi. east of New Denver. Crib-work dam, 45 ft. long and 15 ft. high; water led through wooden flume, 2 x 3 ft. section, 450 ft. long, and iron pipe, 14 to 18 in. diameter, 800 ft. long, to metal-covered frame power house, 40 x 20 ft. Head utilized, 82 ft. Equipment: one 55-h.p. impulse wheel, belted to a 93-k.w., 3-ph., 60-cy., 2,300-v. generator, only one phase of latter being used. Maximum load, 45 k.w. Night service only. Value of power plant, $5,000. Installed 1914, replacing plant built in 1904. **Distribution:** Including Silverton, 9½ mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v.; 12 line transformers, of 31 k.w. total capacity. Number of consumers, 90; connected load, 40 k.w. for lighting and 18 k.w. in appliances. Value of distribution system, $36,000. **Rates:** Lighting, flat, 1·5 to 2 cents per watt. per month; meter, 20 cents per k.w.h., with a monthly minimum.

NEW WESTMINSTER (15,000*). Supplied under municipal control, a block of 800 k.w. being purchased from the British Columbia Electric Railway Co. (see under Vancouver) at 1·25 cents per k.w.h.; distribution being almost entirely for lighting purposes, while power is supplied directly by the generating companies. **Distribution:** 56 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v. Number of consumers, 3,297; connected load, for lighting only, 1,560 k.w. **Rates:** 4 to 9 cents per k.w.h., less 20 per cent discount. Street lighting: 32-c.p. to 1,000-c.p. nitro lamps.

NORTH VANCOUVER (7,500*). Supplied by British Columbia Electric Railway Co. See under Vancouver.

OAK BAY. Supplied by British Columbia Electric Railway Co. See under Victoria.

OCEAN FALLS (2,000†). Supplied from hydro-electric plant of Pacific Mills, Ltd.; operated in connection with mills. **Hydro-electric Plant:** On Link river; concrete dam, 644 ft. long and 53 ft. high, with a 12-ft. steel penstock, 549 ft. long, leading to a concrete power house, 41 x 151 ft. Head utilized, 118 to 151 ft. Equipment: two 2,500-h.p. turbines and one 5,000-h.p. impulse wheel, direct connected, respectively, to two 1,850-k.w. and one 3,750-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, 7,000 k.w., divided, 3 per cent for domestic use and 97 per cent for mill operation. Load factor, 90 per cent. Value of plant, $700,000. Cost of generation, $5 per h.p.-year, including depreciation. Installed 1918, replacing plant built 1911. **Distribution:** Including system for mill operation, 2 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 25 line transformers, of 540 k.w. total capacity. Number of domestic consumers, 135; connected load, 400 k.w. for lighting and 8,300 h.p. in motors. Value of distribution system, $10,000. **Rates:** Energy supplied mostly to employees; no charge. Street lighting: 100-w. to 600-w. lamps; no charge.

PEACHLAND (385†). Supplied under municipal control, from a hydro-electric plant on Trepanier creek. **Hydro-electric Plant:** Concrete dam, 40 ft. long and 10 ft. high, whence a 12-in. pipe leads to a frame power house, 18 x 30 ft. Head utilized, 160 ft. Equipment, one 100-h.p. impulse water wheel, belted to a 50-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 30 k.w. Night service only. Value of power plant, $1,500. Cost of generation, 2 cents per k.w.h. Installed 1910. **Distribution:** 7 mi. of streets and roads; primaries at 2,300 v. and secondaries at 110 v.; 25 line transformers, ranging from 1 k.w. to 10 k.w. Number of consumers, 60; connected load, 27 k.w. for lighting. Value of distribution system, $5,000. **Rates:** Lighting flat rate, 10 to 50 cents per lamp per month, according to number and size. Street lighting: 60-w. tungsten lamps, at $10 per lamp per year.

PENTICTON (3,000*). Supplied from a municipal oil-engine plant. **Power Plant:** Reinforced concrete building, 36½ x 36½ ft.; contains one 200-h.p. Diesel oil engine, belted to a 120-k.v.a., 3-ph., 60-cy., 4,600-v. generator. Fuel: crude oil and distillate; consumption, 22,167 gal. yearly, at 11 cents per gal. Maximum demand, 115 k.v.a. Night service only. Value of plant, $25,000. Cost of generation, 5 cents per k.w.h., including overhead charges. Installed 1913. **Distribution:** 28 mi. of streets and roads; primaries at 4,600 v. and secondaries at 110 v. and 220 v.; 27 line transformers, of 156 k.w. total capacity. Number of consumers, 564; connected load, 320 k.w. for lighting and 175 k.w. in appliances. Value of distribution system, $42,000. **Rates:** 10 to 15 cents per k.w.h., less 20 per cent discount. Street lighting: 60-w. to 250-c.p. nitro lamps, at $25 per year per 100-c.p.

PHOENIX (662). Supplied by Phoenix Electric Lighting Co.; obtained in block from West Kootenay Power and Light Co. (see Rossland). **Distribution:** 3 mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 6 line transformers, of 75 k.w. total capacity. Connected load, 65 k.w. for lighting and 4 motors of 10 h.p. total capacity. Value of distribution system, $9,000. **Rates:** Lighting, 6 to 15 cents per k.w.h. Power and appliances, 4 to 6 cents per k.w.h. Flat lighting rate, $1 monthly per 100-w. lamp. Street lighting: 100-w. tungsten lamps, at $18 per lamp per year.

POINT GREY (13,000*). Supplied by British Columbia Electric Railway Co. See under Vancouver.

PORT ALBERNI (940†). Supplied from municipal oil-engine plant; Alberni system also supplied from this plant. **Power Plant:** Metal-covered frame building, 30 x 30 ft., contains one 150-h.p. Diesel oil engine, direct connected to a 100-k.v.a., 3-ph., 60-cy., 2,200-v. generator. Fuel: fuel oil; consumption, 14,846 gal. per year, at 8 cents. Maximum load, 50 k.w. Night service only. Value of plant, $25,000. Cost of generation, 4½ cents per k.w.h., exclusive of overhead charges. Installed 1913. **Distribution:** 10 mi. of streets and

roads; primaries at 2,200 v. and secondaries at 110 v.; 16 line transformers, ranging from 1 k.w. to 7½ k.w. Number of consumers, 250. Value of distribution system, $23,000. **Rates:** 12½ cents per k.w.h., less 10 per cent discount. Street lighting: 100-w. lamps, at $20 per lamp per year.

PORT MOODY (1,500†). Supplied by British Columbia Electric Railway Co. See under Vancouver.

POWELL RIVER. Supplied from hydro-electric plant of Powell River Co.; operated in connection with mills. **Hydro-electric Plant:** On Powell river; concrete dam 600 ft. long and 30 ft. high, with three 11⅓-ft. steel and wood-stave penstocks, 1,500 ft. long, leading to reinforced concrete power house, 16 x 80 ft. Head utilized, 147 ft. Development is for a total installed capacity of 24,000 h.p., including direct-driven pulp grinders. Hydro-electric equipment: two 3,000-h.p. and one 3,600-h.p. turbines, direct connected, respectively, to two 2,200-k.w. and one 2,500-k.w., 3-ph., 50-cy., 550-v. generators. Maximum load, 5.000 k.w., divided, 7 per cent for lighting and 93 per cent for power; latter is used in mill. Continuous service. Installed 1912. **Distribution:** 3¾ mi. of streets and roads; primaries at 600 v. and 2,200 v. and secondaries at 110 v. and 220 v.; 40 line transformers, ranging from 1½ k.w. to 100 k.w. Number of consumers, outside of mill operation, 225; connected load in mill motors alone, 6,750 k.w. **Rates:** 5 cents per k.w.h. Street lighting: 200-w. and 250-w. tungsten lamps; no charge.

PRINCE GEORGE (1,500*). Supplied from municipal oil-engine plant. **Power Plant:** Concrete building; contains two 150-h.p. semi-Diesel oil engines, belted, respectively, to a 60-k.w. and a 100-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: fuel oil; consumption, 5½ gal. per hour, at 17 cents per gal. Maximum load, 80 k.w., divided, 47 per cent for lighting and 53 per cent for power. Value of power plant, including waterworks pumps $55,033. Night service only. Installed 1917. **Distribution:** 10 mi. of streets and roads; primaries at 2,200 v. and secondaries at 110 v.; 20 line transformers, of 45 k.w. total capacity. Number of consumers, 205; connected load, 40 k.w. for lighting and 75 h.p. in motors for waterworks pumps. Value of distribution system, $17,049. **Rates:** Lighting, 18 to 22 cents per k.w.h.; power, 12 cents per k.w.h. Street lighting: 60-w. and 100-w. lamps.

PRINCE RUPERT (6,005†). Supplied from a municipal hydro-electric plant, 5½ miles distant, and steam auxiliary plant. **Hydro-electric Plant:** Concrete dam, 100 ft. long and 40 ft. high, on Shawatlans river, at foot of Woodworth lake, affording storage of 10,000 ac.-ft. A 45-in. steel penstock, 7,800 ft. long, leads to frame power house, 25 x 35 ft. Head utilized, 253 ft. Equipment: one 1,650-h.p. turbine, direct connected to a 1,125-k.v.a., 3-ph., 60-cy., 4,400-v. generator. Maximum load, 500 h.p.; output divided, 73 per cent lighting and 27 per cent power and appliances. Load factor, 50 per cent. Continuous service. Value of plant, including supply line to city and distributing station, $210,000; portion of cost of dam charged to waterworks, for which it is also used. Cost of generation, 3 cents per k.w.h. Installed 1914. **Transmission Line:** Extends from hydro-electric plant to city, 5½ mi., operates at generator voltage of 4,300 v. Lightning protection, aluminium cell arresters. **Steam Plant:** Frame building, 60 x 100 ft.; contains three 80-h.p. return tubular boilers, at 120 lbs. pressure; two 165-h.p. compound and one 150-h.p. simple engine, the first two direct connected and the latter belted each to a 100-k.v.a., 3-ph., 60-cy., 4,300-v. generator. Fuel: nut coal, at $7.20 to $9 per ton. Plant only used in emergencies. Value of plant, $40,000. Installed 1912. **Distribution:** 13½ mi. of streets and roads; primaries at 4,400 v. and 2,500 v. and secondaries at 115 v. to 440 v.; 76 line transformers, of 1,100 k.w. total capacity. Number of consumers, 1,000. Connected load, 1,150 k.w. for lighting, 140 h.p. in motors and 40 k.w. for appliances. Value of distribution system, $110,000. **Rates:** Lighting, 7½ to 10½ cents per k.w.h.; power, 2½ to 6 cents per k.w.h.; appliances, 1 to 3½ cents per k.w.h. All rates subject to a monthly minimum, meter rental and discount of 10 per cent and up to 15 per cent for lighting. Street lighting: 80-c.p. to 400-c.p. tungsten lamps, at rate of 5 cents per k.w.h., plus maintenance.

PRINCETON (400†). Supplied from steam plant of Princeton Coal Co. **Steam Plant:** Equipment: one 75-h.p. engine, belted to a 50-k.w., 3-ph., 60-cy., 2,300-v. generator. **Distribution:** 5 mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; number of consumers, 100. **Rates:** Meter, 15 cents per k.w.h.; flat, $2.00 per 100-w. monthly. Street lighting: 250-w. lamps, at $30 per lamp per year.

QUATSINO. Supplied from steam plant of Whalen Pulp and Paper Mills; operated mainly in connection with mill. **Steam Plant:** Concrete buildings, 52 x 140 ft. and 40 x 140 ft., contain six 250-h.p. and one 500-h.p. water-tube boiler, also one 1,400-h.p. and one 1,000-h.p. compound engine, direct connected, respectively, to a 1,000-k.w. and a 750-k.w., 3-ph., 60-cy., 2,200-v. generator. Maximum load, full capacity of plant. Fuel: mill refuse and coal. Continuous service. Value of plant, $200,000. Installed 1917. **Distribution:** 1½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; number of consumers, 55; connected load for domestic lighting only, 20 k.w. **Rates:** Charges included in rent of dwellings. Street lighting: 100-w. lamps; no charges.

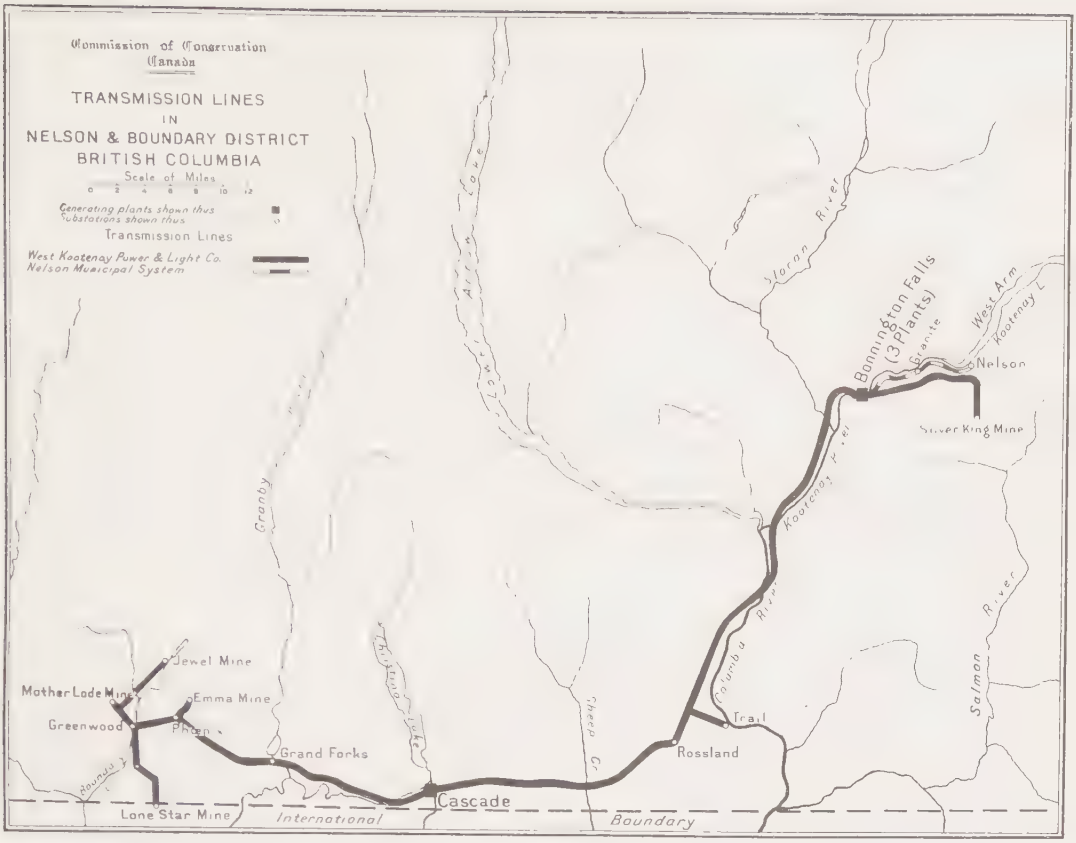
REVELSTOKE (3,150†). Supplied from municipal hydro-electric plant on Illecillewaet river, near the city, with auxiliary producer-gas plant. **Hydro-electric Plant:** Concrete dam, 114 ft. long and 50 ft. high, whence two 6-ft. wooden penstocks, 1,200 ft. long, lead to concrete power house, 43 x 33 ft. Head utilized, 74 ft. Equipment: one 900-h.p. and one 1,400-h.p. turbine, direct connected, respectively, to a 450-k.w. and a 750-k.w., 3-ph. 60-cy., 2,300-v. generator. Maximum load, 415 k.w.; output divided, 75 per cent for lighting and 25 per cent for power. Load factor, 25 per cent. Slight trouble from ice, snow and debris. Value of plant, $236,145. Cost of generation and distribution, 3 cents per k.w.h. Continuous service. Installed 1908. **Producer-gas Plant:** Frame building on concrete foundation, 54 x 28 ft.; contains a gas producer and one 250-h.p. gas engine, belted to a 250-k.w., 3-ph., 60-cy., 2,300-v. generator. Fuel: Bankhead pea anthracite coal, at $7.50 per ton. Plant only used as auxiliary in emergencies. Value of plant, $25,000. Installed 1908. **Distribution:** 11½ mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 78 line transformers, ranging from 0·6 to 25 k.w. Number of consumers, 796; connected load, 522 k.w., including lighting, power and appliances. **Rates:** Lighting, 8 to 13 cents per k.w.h., less 20 per cent discount; power, 0·5 cent to 12 cents per k.w.h.; appliances 2 cents per k.w.h., less 20 per cent discount. Street lighting: 100-w. to 250-w. nitro and 4-amp. magnetite arc lamps.

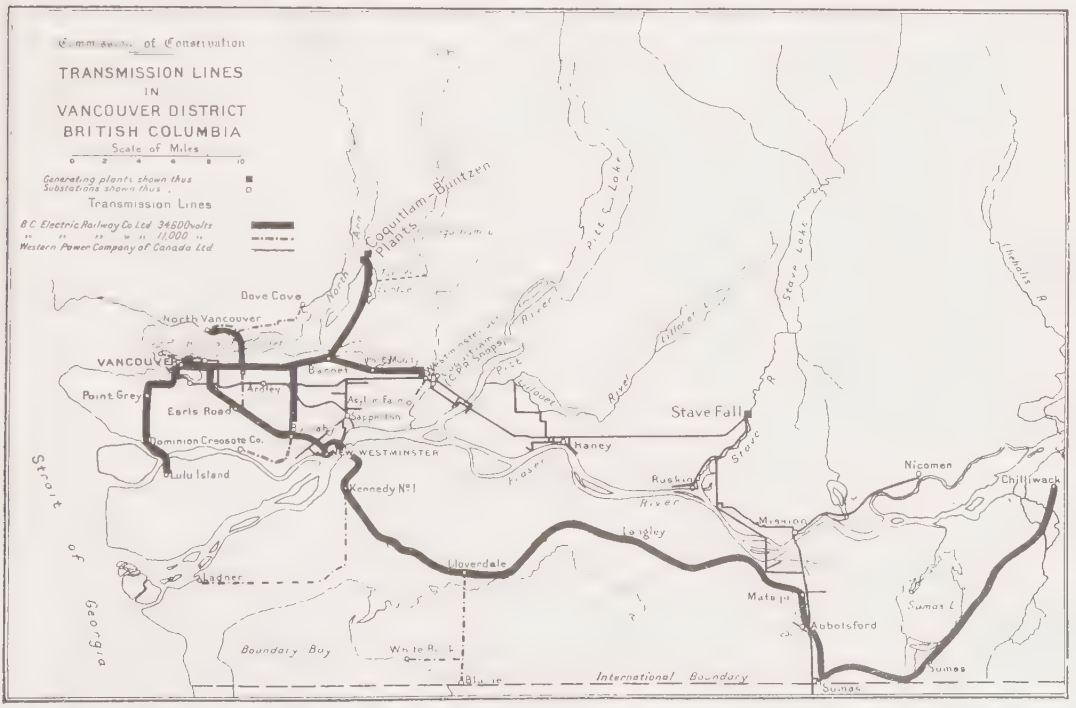
ROSSLAND (3,500*). Supplied by the West Kootenay Power and Light Co., which operates 3 hydro-electric plants, Nos. 1 and 2 at Bonnington falls and the other at Cascade The company also supplies Trail, Phœnix, Grand Forks and mines in Greenwood and Nelson districts. **No. 1 Bonnington Hydro-electric Plant:** Situated on Kootenay river, at Lower Bonnington fall. Concrete dam, 32 ft. high and 56 ft. long; water led through a canal in solid rock, 600 ft. long, 30 ft. wide and 13 ft. deep, thence through 3 penstocks, 10 ft. to 11 ft. diameter and 40 ft. long, to a brick power house, 32 x 66 ft. Head, 34 ft. with variation up to 46 ft. Equipment: two 1,184-h.p. and one 1,684-h.p. turbine, direct connected, respectively, to two 750-k.w. and one 1,500-k.w., 3-ph., 60-cy., 1,100-v. generator; twelve 242-k.w. station transformers, stepping voltage from 1,100 v. to 22,000 v. at 3 ph., 60 cy. Maximum load, 3,000 k.w. Load factor, practically 100 per cent; plant operated in conjunction with other 2 plants and carries its full load continuously. Value of plant, $300,000. Cost of generation in conjunction with other plants, $15 per h.p.-year. Installed in 1897. **No. 2 Bonnington Hydro-electric Plant:** Situated on Kootenay river, at Upper Bonnington fall. Concrete portion of dam, 112 ft. long and 45 ft. high; wooden portion, 1,112 ft. long and 10 ft. high. Six concrete penstocks, four of 15 x 17½ ft. section, each 103 ft. long, and two of 6 x 7½ ft. section, each 82 ft. long, lead to reinforced concrete power house, 40 x 140 ft., where the head is 70 ft. Equipment: two 8,000-h.p. and two 9,000-h.p. turbines, direct connected, respectively, to two 5,625-k.v.a. and two 7,500-k.v.a., 3-ph., 60-cy., 2,200-v. generators; six 1,875-k.v.a. and six 2,000-k.v.a. station transformers,

stepping voltage from 2,200 v. to 60,000 v., and three 1,250-k.v.a. station transformers, stepping voltage from 2,200 v. to 22,000 v., all at 3 ph., 60 cy. Maximum load, 20,000 k.w. Load factor, 89 per cent. Value of plant, $1,153,412. Cost of generation, from combined three plants, $15 per h.p.-year. Installed 1905. **Cascade Hydro-electric Plant:** Situated on Kettle river at Cascade. Timber dam, 30 ft. high and 462 ft. long; water led through an open flume and tunnel a total distance of 1,000 ft., thence through a 7-ft. steel pipe, 300 ft. long, to brick power house, 45 x 131 ft. Head utilized, 156 ft. Equipment: three 1,300-h.p. turbines, each direct connected to a 750-k.w., 3-ph., 60-cy., 2,200-v. generator; nine 312-k.w. station transformers, stepping voltage from 2,200 v. to 22,000 v. at 3 ph., 60 cy. Maximum load, 2,000 k.w.; plant operating as auxiliary to Bonnington plants. Value of plant $300,000. Installed 1901. **Transmission Lines:** There are 4 lines from the two Bonnington plants. Two lines, operating at 60,000 v., 3 ph., 60 cy., extend to Greenwood, *via* Rossland and Cascade, 82 mi. each, with a 3-mi. tap to Trail, giving a total of 170 mi. of single line; each line consists of a single circuit of three 92,000 C.M. copper conductors on pin-type insulators and cedar poles, and is designed to carry 7,000 h.p., with 10 per cent loss; cost per mile, including right-of-way, $4,000. One line, operating at 20,000 v., 3 ph., 60 cy., extends to Rossland, 32 miles long, and consists of 2 circuits of three No. 2 copper conductors on pin-type insulators and cedar poles; each circuit designed to carry 1,700 h.p., with 10 per cent loss; cost per mile, including right-of-way, $2,000. Another 20,000-v. 3-ph., 60-cy. line extends to Silver King mine, via Nelson, 26 miles long, and consists of 2 circuits of three No. 8 copper conductors on pin-type insulators and cedar poles; each circuit designed to carry 1,000 h.p., with 10 per cent loss; cost per mile, including right-of-way, $1,000. All above lines are protected by aluminium-cell lightning arresters. The two 22,000-v., 3-ph., 60-cy. circuits from Cascade plant extend to Greenwood, *via* Grand Forks, and cover a total distance of 27 mi.; each consists of three No. 3 copper conductors on pin-type insulators and cedar poles; they carry 2,000 k.w. with 10 per cent loss. Lightning protection, multiplex arresters. **Substation :** The above transmission lines supply the following substations:

Substation	Load for lighting	Load for motors	Total demand	Average load factor
	k.w.	h.p.	h.p.	Per cent
Rossland	500	5,200	5,867	..
Trail	400	23,000	23,533	91
Grand Forks	300	2,075	2,475	93
Phœnix	250	4,350	4,683	84
Greenwood	...	2,725	2,725	54
Silver King Mine	...	300	300	..
Emma Mine	...	350	350	..
Lone Star Mine	...	150	150	..
Mother Lode Mine	...	1,600	1,600	..
Jewel Mine	...	250	250	..
Irrigation Substation	...	100	100	..

Cascade is supplied with 10 k.w. for lighting directly from power plant.


Commission of Conservation
Canada
TRANSMISSION LINES
IN
NELSON & BOUNDARY DISTRICT
BRITISH COLUMBIA
Scale of Miles
0 2 4 6 8 10 12
Generating plants shown thus
Substations shown thus
Transmission Lines
West Kootenay Power & Light Co.
Nelson Municipal System
Slocan River
Lower Arrow Lake
Bonnington Falls
(3 Plants)
Granite
West Arm
Kootenay L.
Nelson
Silver King Mine
Granby River
Kootenay R.
Columbia River
Salmon River
Jewel Mine
Mother Lode Mine
Emma Mine
Greenwood
Phoenix
Grand Forks
Kettle River
Kettle Lakes
Granby R.
Trail
Rossland
Boundary
Lone Star Mine
International
Cascade
Boundary


of Conservation
TRANSMISSION LINES
IN
VANCOUVER DISTRICT
BRITISH COLUMBIA
Scale of Miles
0 2 4 6 8 10
Generating plants shown thus
Substations shown thus
Transmission Lines
B.C. Electric Railway Co. Ltd. 34600 volts
" " " " " 11,000 "
Western Power Company of Canada Ltd.
Coquitlam-Buntzen Plants
North Arm
Pitt Lake
Pitt River
Stave Lake
Stave R.
Lillooet R.
Dove Cove
North Vancouver
VANCOUVER
Barnet
Westminster Canal
Coquitlam
Fraser River
Stave Falls
Point Grey
Kitsilano
Arbutus
Earls Road
Dominion Creosote Co.
Lulu Island
WESTMINSTER
Haney
Strait of Georgia
Kennedy No. 1
Ruskin
Nicomen
Chilliwack
Mission
Langley
Cloverdale
Matsqui
Abbotsford
Sumas L.
Boundary Bay
White Rock
International Boundary
Sumas

Sub-station	Number and capacity of station transformers	Stepping voltage from	To
		volts	volts
Rossland	Three 1,250-k.v.a.	60,000	2,200
	Nine 242-k.w.	16,600	2,200 and 400
Trail	Six 2,500-k.v.a.	60,000	2,000
	Three 1,250-k.v.a.	16,500	600
Grand Forks	Four 1,250-k.v.a.	60,000	2,200 and 440
	Three 312-k.w.	20,000	550
	Three 242-k.w.	20,000	550
Phœnix	Three 1,250-k.v.a.	60,000	2,200 and 440
	Three 312-k.w.	20,000	2,000
Greenwood	Three 1,250-kva.	60,000	2,200 and 440
	Three 312-k.w.	20,000	2,000
Silver King Mine	Three 242-k.w.	16,600	2,200
Jewel Mine	One 225-k.w.	20,000	2,000
Mother Lode Mine	Three 312-k.w.	20,000	2,000

All the above are at 3 ph., 60 cy. **Rates:** The meter rate to large consumers, principally for mining purposes, is 0·6425 cent per k.w.h. To very large consumers, rate is 0·302 cent per k.w.h.

Rossland Local System—Distribution: 12 mi. of streets; primaries at 2,080 v. and secondaries at 115 v. and 230 v.; 47 line transformers, ranging from 2 k.w. to 15 k.w. Number of consumers, 800. Value of system, $50,000. **Rates:** Lighting meter rate, 4 to 10 cents per k.w.h., less 10 per cent discount, with a monthly minimum and meter rental. Lighting flat rate, 25 cents to $1 per 60-w. lamp per month, according to number and uses; power, 2 to 5 cents per k.w.h., less 20 per cent discount, with a monthly minimum. Street lighting: magnetite arc, 100-w. and 60-w. lamps, at $90, $15.60 and $9.60 per lamp per year, respectively.

SAANICH DISTRICT. Supplied by British Columbia Electric Railway Co. See under Victoria.

SALMON ARM (500†). Supplied from a municipal oil-engine plant. **Power Plant:** Brick building, 33 x 40 ft., contains one 150-h.p. Diesel oil engine, direct connected to a 100-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil; consumption, 8,000 gal. per year, at 10 cents per gal. Maximum load, 22 k.w. Night service only. Value of plant, $36,036. Cost of generation, 6·8 cents per k.w.h. Installed 1913. **Distribution:** 3¼ mi. of streets; primaries at 2,200 v. and secondaries at 110 v.; 10 line transformers, of 100 k.w., total capacity. Number of consumers, 105; connected load, 52 k.w. for lighting and 3 h.p. in motors. Value of distribution system, $4,500. **Rates:** Lighting, 14 and 16 cents per k.w.h., less 20 per cent discount; power and signs, 8 cents per k.w.h. Street lighting: 100-c.p. and 250-c.p. lamps; no charge.

SANDON (300†). Supplied from hydro-electric plant of Sandon Waterworks and Light Co., on Sandon creek. **Hydro-electric Plant:** Three timber crib dams, each 12 ft. long and 4 ft. high; water led through wooden flume, 10 x 12 in. section, 4,600 ft. long, and a steel pipe 10 in. and 14 in. diameter, 4,000 ft. total length, to frame power house, 30 x 80 ft. Head utilized, 400 ft. Equipment: one 175-h.p. impulse water wheel, belted to two 35-k.w. 125-v., d.c. generators. Maximum load, 30 k.w. Slight trouble from shortage of water and floods. Night service only. Value of plant, $30,000, including distribution system. Installed 1896. **Distribution:** One mi. of streets, at 125 v., d.c. Number of consumers, 75; connected load, 30 k.w. for lighting. **Rates:** Monthly flat rate, 2 to 4 cents per c.p.

SICAMOUS. Supplied from steam plant, operated by Canadian Pacific Railway Co., mainly in connection with hotel and station. **Steam Plant:** Two 50-h.p. boilers, at 80 lbs. pressure; one 35-h.p. and one 45-h.p. engine, direct connected, respectively, to a 25-k.w. and a 35-k.w., d.c., 120-v. generator. **Distribution:** System only supplies a few outside consumers, in addition to hotel and station, at 120 v., d.c.

SOUTH VANCOUVER (25,000*). Supplied by British Columbia Electric Railway Co. See under Vancouver.

SPENCE BRIDGE (105†). Supplied from hydro-electric plant of A. Clemes, on Murray creek. **Hydro-electric Plant:** Concrete dam, 16 ft. long and 20 ft. high, with a 10-in. pipe leading to a concrete power house, 40 x 30 ft. Head utilized, 200 ft. Equipment: 200-h.p. impulse wheel, belted to a 75-k.w., 3-ph., 60-cy., 2,300-v. generator. Maximum load, 4 k.w. Night service only. Value of plant, $40,000. Installed, 1913. **Distribution:** 2½ mi. of streets; primaries at 2,300 v. and secondaries at 110 v.; 5 line transformers, of 35 k.w. total capacity. Number of consumers, 20. **Rates:** Flat rate, 50 cents per lamp per month.

SUMMERLAND (2,500*). Supplied from a local municipal hydro-electric plant. **Hydro-electric Plant:** Water obtained from municipal reservoir on Prairie creek, used also for water supply and irrigation. Wood-stave pipe, 6 in. to 14 in. diameter, one mile long, leads to concrete-block power house, 20 x 40 ft. Head utilized, 400 ft. Equipment: one 42-h.p. impulse wheel, belted to a 30-k.w., 2-ph., 60-cy., 2,200-v. generator. Maximum load, 28 k.w. Night service only. Value of plant, $20,000. Cost of generation, 6·8 cents per k.w.h. Installed, 1904. **Distribution:** 7 mi. of streets; primaries at 2,200 v., and secondaries 110 v.; 23 line transformers, of 60 k.w. total capacity. Number of consumers, 150; connected load, 75 k.w. for lighting and 75 k.w. in appliances. Value of distribution system, $2,250. **Rates:** 12½ cents per k.w.h., with a monthly minimum. Street lighting: 60-w. tungsten lamps, at $15 per lamp yearly.

SWANSON BAY. Supplied from hydro-electric plant of Whalen Pulp and Paper Mills, Ltd ; operated in connection with mills. **Development:** On Yule river near mouth; rock-filled crib dam, 150 ft. long and 10 ft. high, with a 5-ft. wooden conduit, 1,000 ft. long, leading to mill and supplying a total installation of 2,500 h.p. under a head of 130 ft. **Hydro-electric Plant:** Installed in mill. Equipment: one 350-h.p., one 200-h.p. and one 75-h.p. turbine, the first two direct connected, respectively, to a 250-k.w. and a 150-k.w., and the third belted to a 50-k.w., 3-ph., 60-cy., 500-v. generator. Maximum load, 450 k.w., of which only a small portion is for domestic purposes. Continuous service. Installed, 1910. **Distribution:** ½ mi. of streets; primaries at 500 v. and secondaries at 110 v.; 5 line transformers. Number of consumers, 35; connected load, 18 k.w. for lighting and approximately 500 h.p. in motors used in mill. **Rates:** Energy supplied mostly to employees at a nominal charge as part of rent for dwellings. Street lighting: 100-w. lamps.

TOD INLET. Supplied by British Columbia Electric Railway Co. See under Victoria.

TRAIL (4,000†). Supplied by West Kootenay Power and Light Co. (See under Rossland) **Distribution:** 6 mi. of streets; primaries at 2,080 v. and secondaries at 115 v.; 43 line transformers, ranging from 1½ k.w. to 10 k.w. Number of consumers, 700. Value of distribution system, $30,000. **Rates:** Lighting meter rate, 4 to 10 cents per k.w.h., less 10 per cent discount, with a monthly minimum and meter rental; lighting flat rate, 25 cents to $1 per 60-w. lamp per month, according to number and uses; power, 2 to 5 cents per k.w.h., less 20 per cent, with a monthly minimum. Street lighting: magnetite arc, 100-w. and 60-w. lamps, at $90, $15.60 and $9.60 per lamp per year, respectively.

UNION BAY. Supplied from Canadian Collieries system. See under Cumberland.

UPLANDS (60†). Supplied by Uplands, Limited; energy purchased in block from British Columbia Electric Railway Co. (see under Victoria), at 3 cents per k.w.h. **Distribution:**

3½ mi. of streets, all underground; primaries at 2,200 v. and secondaries at 220 v.; 5 distribution transformers, of 90 k.w. total capacity. Number of consumers, 16; connected load, 20 k.w. for lighting and 3 h.p. in motors. Value of system, $130,000. **Rates:** Same as British Columbia Electric Railway Co. for Victoria and vicinity. Street lighting: 100-w. tungsten lamps, at $4.30 per lamp per year.

VANCOUVER (102,550†). Supplied by B. C. Electric Railway Co., from two hydro-electric plants on the same development, deriving water from Coquitlam and Buntzen lakes, with an auxiliary steam plant in Vancouver; also supplied by Western Power Company of Canada, from hydro-electric plant on Stave river, the latter company selling energy in block to former company and distributing in the Vancouver district for industrial and railway purposes.

British Columbia Electric Railway Co. System—System also comprises district east of Vancouver to Chilliwack, including the latter and South Vancouver, New Westminster, Cloverdale, Burnaby, Point Grey, North Vancouver, Port Moody, Delta and Langley. **Development:** Coquitlam Lake dam, hydraulic fill, 100 ft. high and 1,200 ft. long; tunnel 2½ mi. long and 192 sq. ft. section, leads from latter lake to lake Buntzen, where concrete dam, 54 ft. high and 360 ft. long, forms forebay reservoir. Ten steel pipe lines, 4 to 7 ft. in diameter, and 2,000 ft. long, lead from lake Buntzen to No. 1 power house. A concrete-lined tunnel, 14½ ft. diameter and 1,800 ft. long, terminates in a storage tank, whence water is led through three steel pipes, 7 to 8½ ft. in diameter and 600 ft. long, to No. 2 power house. Head utilized, at both plants, 400 ft. Lake Coquitlam is used as a conservation reservoir, with storage capacity of 180,000 acre-feet. **No. 1 Power House:** Granite building, 300 x 40 ft., with concrete transformer house, 150 x 60 ft. Equipment: four 3,000-h.p. and three 10,500-h.p. impulse water wheels, direct connected, respectively, to four 1,500-k.w. and three 5,000-k.w., 3-ph., 60-cy., 2,200-v. generators; nine 3,000-k.v.a. station transformers, stepping voltage from 2,200 v. to 34,600 v. at 3 ph., 60 cy. In operation since 1903. **No. 2 Power House:** Reinforced concrete building, 200 x 65 ft., contains three 13,500-h.p. impulse water wheels, each direct connected to an 8,900-k.v.a., 3-ph., 60-cy. 2,200-v. generator; twelve 3,000-k.v.a. station transformers, stepping voltage up from 2,200 v. to 34,600 v. In operation since 1913. Maximum load, full capacity of plants. Output divided, 30 per cent lighting, 30 per cent power and 40 per cent electric railway. Plants interconnected by transmission line ⅓ mi. long. **Transmission Lines:** A 34,600-v. line extends from each of the two hydro-electric power houses to the various substations supplied at this voltage, including from Vancouver, 16 mi. distant, to Chilliwack, 78 mi. distant, with branches at this voltage and at 11,000 v. The line from No. 1 power house is on wooden poles with pin-type insulators; the other on steel towers with suspension insulators; each line has two circuits of three conductors. The 34,600-v. lines have a total length of 147 miles and the 11,000-v. lines cover 48 mi. **Substations:** The transmission system supplies the following substations:

Location	Station transformers (light and power)			Apparatus for 600 v., d.c. railway service
	Total capacity	Stepping voltage		
		From	To	
	k.v.a.	volts	volts	k.v.a.
Vancouver (3 stations)	45,000 22,500	34,600 11,000	11,000 2,300	10,500
North Vancouver	1,500 750	34,600 34,600	2,300 11,000	675
Point Grey	4,500	34,600	2,300	2,000
Lulu Island	375	34,600	2,300	500
Earls Road	6,000 2,000	34,600 34,600	11,000 2,300	2,250
Burnaby	2,000 1,500	34,600 4,600	11,000 2,300	500
New Westminster	1,650	34,600	2,300	1,675
Cloverdale	1,650 1,500	34,600 34,600	11,000 2,300	600
Langley	450 375	34,600 34,600	5,500 2,300	800
Matsqui	450 375	34,600 34,600	5,500 2,300	600
Sumas	375	34,600	2,300	300
Chilliwack	375	34,600	2,300	300
Deep Cove	750	11,000	2,300	.....
Barnet	300	34,600	2,300	.....
Port Moody	300	34,600	2,300	.....
Dom. Creosoting Co.	480	11,000	2,300	.....
Westminster Junction	1,500 75	34,600 34,600	11,000 2,300	.....
Can. Pac. Ry. Shops	300	11,000	2,300	.....
Asylum Farm	300	11,000	2,300	.....
Kennedy No. 1	450	34,600	11,000	.....
Ladner	300	11,000	2,300	.....
White Rock	500	11,000	2,300	.....
Blaine	90	11,000	2,300	.....

Steam Plant: Brick building, 190 x 120 ft., contains twelve 500-h.p. water-tube boilers; one 5,000-k.w. and four 2,000-k.w. steam turbine units, at 3 ph., 60 cy., 2,200 v. Fuel: oil. Plant now only used in emergencies. Installed 1910, replacing previous plant. **Distribution:** Including all systems supplied by company on mainland, 662 mi. of streets or roads; primaries at 2,200 v. and 5,500 v. and secondaries at 110 v. and 220 v.; 6,000 line transformers, of 57,000 k.w. total capacity. Number of consumers, 40,600; connected load 40,125 k.w. for lighting and 30,180 k.w. in motors. **Rates:** Domestic, in Vancouver and Greater Vancouver, 3 to 8 cents per k.w.h., with a monthly minimum. Domestic, Fraser valley, 4 to 11 cents per k.w.h., with a meter rental, less 20 per cent discount; commercial, 4 to 8 cents per k.w.h., with a monthly minimum, less 20 per cent discount; monthly meter rental in Fraser valley, 15 cents; signs, monthly flat rate of 13·3 to 18·5 cents per 4-c.p. lamp, according to restrictions and number. Power, 0·5 cent to 7 cents per k.w.h., with a monthly minimum, less discounts up to 15 per cent to large consumers; kitchen ranges, 3 cents per k.w.h. with a monthly minimum; monthly flat rate for water heaters, $3.50 per k.w.; appliances, 2 to 5 cents per k.w.h., with monthly minimum. Street lighting: for Vancouver, 400-c.p. and 600-c.p. nitro lamps, at $35 and $38 per lamp per year, respectively; outside of Vancouver, enclosed arc and 100-w. lamps, yearly charge, $36.50 to $65.60 per arc and $18 to $27 per 100-w. lamp according to number and service.

Western Power Company of Canada System—Hydro-electric Plant: On Stave river

35 mi. east of Vancouver. Two concrete dams, 50 ft. high and 150 and 160 ft. long, respectively, with 5 sluice-ways, each 22 ft. wide; four 14½-ft. steel penstocks, 160 ft. long, lead to a concrete power house, 100 x 160 ft., where head is 105 ft. Equipment: three 13,000-h.p. turbines, each direct connected to a 9,000-k.v.a., 3-ph., 60-cy., 4,400-v. generator, with two independently-driven exciters; twelve 3,000-k.w. station transformers, stepping voltage from 4,400 v. to 60,000 v. at 3 ph., 60 cy. Provision for installation of fourth generating unit. Stave lake will be used as a conservation reservoir by raising head an additional 15 ft., giving a storage area of 24 sq. mi. The maximum load is 24,000 k.w., divided into 63 per cent to British Columbia Electric Ry. Co., 21 per cent to Puget Sound Traction, Light and Power Co., and 16 per cent to its own industrial distribution system. Average load factor, 55 per cent. Continuous service. Installed 1912. **Transmission Lines:** Two 60,000-v. lines extend from power plant; one to Vancouver, 30 mi. long, consists of two circuits of three No. 00 conductors, with suspension insulators and steel towers; the other, to supply Puget Sound Traction, Light and Power Co., to the south, is single circuit and 60 mi. long, giving a total of 90 mi. of lines. Lightning protection, electrolytic arresters. **Substations:** The Ardley substation supplies Vancouver district, and has an equipment of six 3,000-k.w. station transformers, stepping voltage from 60,000 v. to 13,000 v. at 3 ph., 60 cy. Energy is supplied directly at 60,000 v. to both the British Columbia Electric Railway Co. and Puget Sound Traction, Light and Power Co. **Distribution:** Mainly for industrial purposes; includes Vancouver, New Westminster and Fraser Valley district, 60 mi. east of Vancouver; 170 mi. of pole line and 24 mi. underground; primaries at 12,000 v. and 2,300 v. The principal stations stepping down from 12,000 v. to 2,300 v. have the following total capacity: Vancouver (2 stations), 4,000 k.w.; New Westminster, 500 k.w.; Coquitlam, 500 k.w.; Pitt River, 1,000 k.w.; Mission, 500 k.w.; stations also at Clayburn, Nicomen, etc., giving a total of 625 distribution transformers, ranging from 5 k.w. to 333 k.w., and of 7,000 k.w. total capacity. **Rates:** For industrial purposes, 0·5 cent to 2 cents per k.w.h., plus a monthly fixed charge of $1 per h.p.

VERNON (2,500*). Supplied from municipal oil-engine plant. **Power Plant:** Reinforced concrete building, 38 x 50 ft., contains one 200-h.p. and one 525-h.p. Diesel oil engine, direct connected, respectively, to a 150-k.w. and a 375-k.w., 3-ph., 60-cy., 2,200-v. generator. Fuel: crude oil; consumption, 67,011 gal. per year, at 8·25 cents per gal. Continuous service. Value of plant, $115,000. Cost of generation, including overhead charges, 4½ cents per k.w.h. Installed 1913. **Distribution:** 19 mi. of streets; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 86 line transformers, of 615 k.w. total capacity. Number of consumers, 775; connected load, 493 k.w. for lighting, 224 k.w. in motors, and 210 k.w. for appliances Value of distribution system, $53,000. **Rates:** Lighting, 10 cents per k.w.h., less 20 to 25 per cent discount, with a monthly minimum; appliances, 1·5 to 2·5 cents per k.w.h., less 10 per cent discount, with a monthly minimum; power, 1·5 to 5 cents per k.w.h., plus fixed charge of $1 per h.p., less 10 per cent discount. Street lighting: arc and 400-c.p. and 600-c.p. nitro lamps, at $44.80 per lamp yearly.

VICTORIA (45,000*). Supplied by British Columbia Electric Railway Co., from two hydro-electric plants, one on the Jordan river and the other on Goldstream river, while the company also has a steam auxiliary plant at Brentwood. In addition, the company supplies surrounding district, including Esquimalt, Oak Bay, Tod Inlet and Saanich district, and supplies energy in block to Victoria municipality for street lighting, to Uplands, Ltd., for distribution in Uplands, and to office buildings in Victoria, to be retailed to tenants.

British Columbia Electric Railway Co. System—Jordan River Hydro-electric Plant: Situated on Jordan river, 40 mi. from Victoria. Ambursen-type concrete dam, 126 ft. high and 891 ft. long, with a timber flume, 6 x 6 ft. section and 5·3 mi. long, leading to a forebay formed by earth embankments, having a total length of 1,260 ft. and 35 ft. high; thence water is led through 3 steel pipes, each 9,290 ft. long and from 30 to 54 in. in diameter, to a concrete power house, 74 x 211 ft. Head utilized, 1,145 ft. Equipment, two 6,000-h.p. impulse water-wheels and one pair of impulse water-wheels of 13,000 h.p. total capacity, direct connected, respectively, to two 4,000-k.w. and one 8,000-k.w., 3-ph., 60-cy., 2,200-v.

West Kootenay Power and Light Co. See under Rossland.

generator; seven 1,450-k.w. and three 3,000-k.w. station transformers, stepping voltage from 2,200 v. to 60,000 v., at 3 ph., 60 cy. Maximum demand, 8,450 k.w. Load factor, 64 per cent. Output divided, 30 per cent for lighting, 33 per cent for power and 37 per cent for electric railway. Water storage of 940 million cu. ft. has been developed. Value of plant, $2,792,995. Cost of generation, 0·07 cent per k.w.h. Installed 1911. **Goldstream Hydro-electric Plant:** Development on Goldstream river, 12 mi. north of Victoria, and is also used by the Esquimalt Waterworks Co. Water is led from five storage reservoirs through ditches and natural channels to a balancing reservoir of 3½ million cu. ft. capacity; thence through a 33-in. steel pipe, 8,000 ft. long, to a brick power house on concrete foundation. Head utilized, 650 ft. Equipment: two 600-h.p. and one 1,000-h.p. impulse water-wheels and a pair of impulse water-wheels having a total capacity of 2,000 h.p., direct connected, respectively, to two 350-k.w., one 500-k.w. and one 1,000-k.w., 3-ph., 60-cy., 750-v. generator. Plant only used as an auxiliary since 1914. Value of plant, $118,649. Cost of generation, 0·47 cent per k.w.h. Installed 1898. **Steam Plant:** Situated at Brentwood bay. Reinforced concrete and steel building, 220 x 140 ft., contains six 1,200-h.p. water-tube boilers, at 190 lbs. pressure; two 2,000-k.v.a. steam turbine units, at 3 ph., 60 cy., 2,300 v. Fuel: crude oil, at 95 cents per bbl. Maximum load, 4,672 k.w. Plant only operated as auxiliary to hydro-electric plants. Value of plant, $667,649. Cost of generation, 3·87 cents per k.w.h. Installed 1912. **Transmission Lines:** The line from Jordan River plant to Victoria is 43 mi. long, operates at 60,000 v., 3 ph., 60 cy., and consists of one circuit, of 3 No. 00 aluminium conductors, supported by suspension-type insulators on wooden poles; the circuit can carry a total of 9,000 k.w. with a loss of 16 per cent. The line from Goldstream plant to Victoria is 12 mi. in length, and operates at 11,000 v., 3 ph., 60 cy.; it can transmit 1,600 k.w. with a loss of 16 per cent. The line from Brentwood steam plant to Victoria is 13 mi. in length and operates at 60,000 v. Other lines, both at 11,000 v. and 60,000 v., include Bamberton, Saanich, James Island and Wilkinson Road lines; these, with the lines from the various power plants, give a total of 83 mi. of 60,000-v. and 27 mi. of 11,000-v. lines. Lightning protection, aluminium tank arresters. The cost per mi. varies from $1,600 to $5,600 for 60,000-v. lines and from $1,730 to $2,400 for 11,000-v. lines. **Substations:** The equipment at Rock Bay substation, supplying Victoria, comprises six 1,400-k.w. transformers, stepping voltage from 60,000 v. to 2,000 v.; three 400-k.w. transformers, stepping voltage from 11,000 v. to 2,000 v. at 3 ph., 60 cy., and two 1,000-k.w. motor-generator units for electric railway service. At Brentwood, four 2,000-k.w. transformers, step voltage from 60,000 v. to 2,300 v., and three 1,000-k.w. transformers, step voltage from 60,000 v. to 11,000 v. at 3 ph., 60 cy. The Bamberton and Tod Inlet substations supply motive power only, the equipment comprising three 1,000-k.w. transformers at the former and six 750-k.w. transformers at the latter, stepping voltage from 60,000 v. to 600 v. at 3 ph., 60 cy. There are also a number of outdoor substations supplied from the 11,000-v. lines, these really forming a part of the distribution system, the voltage being stepped down to 2,200 v. for local distribution. **Distribution Systems:** Including Victoria and the various districts supplied by company, 250 mi. of streets and roads, with 0·28 mi. underground; primaries at 2,200 v. and secondaries at 110 v. and 220 v.; 1,022 line transformers, ranging from 0·6 to 50 k.w. Number of consumers, 13,254; connected load, 12,410 k.w. for lighting and 18,265 h.p. in motors. Total value of distribution systems, $750,000. **Rates:** Lighting, 4 to 11 cents per k.w.h., less 20 per cent discount, with a meter rental; appliances, 3 cents per k.w.h., with a monthly minimum or flat rate of $2.50 per month for a 750-w. heater for restricted use; power rate, 0·5 cent to 7 cents per k.w.h., with a monthly minimum.

Municipal Street Lighting System—Energy purchased from British Columbia Electric Railway Co., at 1·075 cents per k.w.h.; comprises magnetite and a.c. enclosed arc lamps and 40-c.p. nitro lamps, the yearly cost per lamp being estimated at $45 for magnetite and $50 for a.c. arc. Total estimated value of system, $200,000.

WALHACHIN (100†). Was supplied from oil-engine plant of Anglesey Estate. Plant not in operation, due to temporary de-population owing to war. **Power Plant:** One 15-h.p. oil engine, belted to a 10-k.w., d.c., 110-v. generator, with a storage battery. **Distribution:** Number of consumers, 12; connected load, 25 k.w. for lighting.

PACIFIC MILLS LTD.—OCEAN FALLS PLANT, OCEAN FALLS, B.C.

BRITISH COLUMBIA ELECTRIC RAILWAY CO.—JORDAN RIVER HYDRO-ELECTRIC PLANT,
43 MILES WEST OF VICTORIA, B.C.

YUKON

DAWSON (3,013). Supplied by Dawson Electric Light and Power Co.; a portion of energy obtained in block from hydro-electric system of Canadian Klondyke Power Co., and a portion from own steam plant.

Canadian Klondyke Power Co. System—Hydro-electric plant situated on North fork of Klondike river, energy being transmitted to various mines for mining purposes and, for a portion of supply, to Dawson city. **Hydro-electric Plant:** Wooden dam, 85 ft. long and 6 ft. high, with an open canal or ditch, 6 mi. long, 36 ft. wide and 6 ft. deep; grade 4 ft. per mi., whence two 8-foot steel penstocks, tapering to 4 ft. in diameter and 1,570 ft. long, lead to metal-covered frame power house, 40 x 100 ft. Head, 228 ft. Equipment: two 5,000-h.p. turbines, each direct connected to a 3,000-k.v.a., 3-ph., 60-cy., 2,300-v. generator, and six 1,250-k.v.a. station transformers, stepping voltage from 2,300-v. to 33,000 v. at 3 ph. 60 cy. Maximum load, 4,000 k.w. Trouble is experienced in winter from both ice and water shortage. Continuous service. Value of plant, including transmission lines and substations, $1,699,454. Cost of generation, 1·22 cents per k.w.h. Installed 1911. **Transmission Lines:** Two lines extend from power plant, one to Dawson, 22 mi. long, and the other to Dominion Creek, 13 mi. long, with a tap from latter 4 mi. in length, giving a total length of 39 mi. of lines; they operate at 33,000 v., 3 ph., 60 cy., and comprise a single circuit of three No. 00 copper conductors on pin-type insulators and wooden poles. Lightning protection, electrolytic arresters. **Substations:** The above lines supply five substations, equipped with the following station transformers, stepping voltage down from 33,000 v. to 2,200 v. at 3 ph., 60 cy.: Last Chance, one 1,850-k.v.a., 3-ph. unit; Bear Creek, one 1,850-k.v.a., 3-ph. unit; Bonanza, from which Dawson is supplied, two 1,850-k.v.a., 3-ph. units; Hunker, two 400-k.v.a., single-ph. units; Dominion, two 400-k.v.a., single-ph. units.

Dawson Electric Light and Power Co. System—Energy obtained mainly from Canadian Klondyke Power Co., at from 4 to 8 cents per k.w.h., according to season, but a portion from the company's own steam plant. **Steam Plant:** Metal-covered frame building, 88 x 73 ft., contains two water-tube boilers of 300 h.p. and 400 h.p., respectively, at 130 lbs. pressure, and one 150-k.v.a. steam turbine unit at 3 ph., 60 cy., 2,400 v. Fuel: Tantalus coal and spruce cordwood; consumption per day, either 11 to 12 tons of coal, at $10 per ton, or 10 to 11 cords of wood, at $12 per cord. Continuous service; plant only operates a portion of year to supplement purchased energy. Maximum demand, 200 k.v.a. Value of plant, $123,636. Cost of generation, 7·6 cents per k.w.h. Installed 1900. **Distribution:** 6 mi. of streets; primaries at 2,300 v. and secondaries at 110 v. and 220 v.; 44 line transformers, of 200 k.w. total capacity. Number of consumers, 550. Connected load, 220 k.w. for lighting and 185 h.p. in motors. Value of distribution system, $18,139. **Rates:** Lighting, 8 cents to 25 cents per k.w.h., with a monthly minimum and meter rental; power, 8 to 20 cents per k.w.h., with a meter rental. Street lighting: 100-w. tungsten lamps, at a meter rate of 8 to 25 cents per k.w.h., according to consumption.

WHITEHORSE (450†). Supplied from steam plant of Yukon Electric Co. **Steam Plant:** Frame building, 50 x 20 ft., contains a 60-h.p. return tubular boiler, at 85 lbs. pressure, and one 60-h.p. engine, belted to a 15-k.w., 220-v., d.c. generator. Fuel: wood, at $6.50 per cord, Night service only. Value of plant, $20,000. Cost of generation, 11 cents per k.w.h. Installed 1901. **Distribution:** 3 mi. of streets, at 110 v. and 220 v., 3 wire, d.c. Number of consumers, 110; connected load, 30 k.w. for lighting. Value of distribution, $1,213. **Rates:** 25 to 40 cents per k.w.h., with a meter rental. Street lighting: 60-w. lamps, at $50 per lamp per year.

NOTE—Except where otherwise stated, the statistics of population have been extracted from the Census of 1911.

† Population statistics with a dagger have been obtained from the municipality.

TABLE I

Electric Plants in Canada—Tabulated Summary of Power Plants

Abbreviations:

Ownership: p=private; m=municipal or public.
Kind of Prime Movers: h=water-power; t=steam turbine; e=steam engine; g=gas; o=oil or gasolene.
Service: c=continuous; n=night; a=auxiliary plant.

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
NOVA SCOTIA								
Amherst	p	1,300 1,500	t e	2,400	3	950	c	Load factor 60%. Generation cost 1·3c. per k.w.h.
Annapolis Royal	m	240	h	120	2	70	n	Head 47 ft. Use storage.
Antigonish	p	175	e	105	d.c.	50	n	
Bear River	p	60	h	60	3	50	n	Head 70 ft. Use storage.
Bridgetown	p	175	h	108	1	65	n	Head 250 ft.
Bridgewater	m	319	h	240	2	132	n	Head 25 ft. Trouble, ice.
Canso	m	95	g	62	3	45	n	
Dartmouth	m	30	h	36	3	10	n	Operates from water main at 75 lbs. pressure.
Digby	p	136	e	70	1	39	n	Generation cost 3·75c. per k.w.h.
Glace Bay	m	660	e	480	2	254	c	Cost of current at switchboard, 3·54c. per k.w.h.
Halifax	p	5,555 1,720	t e	5,000 1,340	3	3,200	c	Load factor 28.5%.
Hantsport	p	75	e	62	3	34	n	Generation cost 15c. per k.w.h.
Inverness	p	75	e	50	d.c.	38	n	
Kentville	p	120	e	90		90	n	Max. load exceeds capacity.
Lawrencetown	m	40	e	30	3	9	n	
Liverpool	m	750	h	540	2	225	c	Head 21 ft.
Lunenburg	p	400	h	240	3		n	Head 22 ft.
Mahone	m	50	h	40	1	20	n	Head 60 ft.
Middleton	m	250	h	180	3	50	n	Head 32 ft.
Oxford	p	400	h	210	3	112	c	Head 20 ft.
"	p	150	e	120	3		a	
Parrsboro	m	140	e	114	1&2	45	n	
Pictou	m	579	e	337	3	176	c	Generation cost 4·5c. per k.w.h. Load factor 28%.
Shelburne	m	400	h	420	3	150	c	Head 28 ft.
Springhill	p	510	e	423	2&1	190	n	Generation cost, excl. of interest, approx. $50 per h.p.-yr.
Stellarton	p	2,225	e	975 500	3 d.c.	800	c	Generation cost 2·1c. per k.w.h.
Stewiacke	p	125	e	60	3	40		

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
Nova Scotia—*continued*								
Sydney Mines	p	525	e	250	2	150	c	
" "	p	1,067	e	800	d.c.		c	
		3,667	t	3,300	3			
Sydney	p	694	t	300	d.c.	1,797	c	Load factor 35%.
		1,200	e	1,345	2			
Truro	m	485	e	475	d.c.	300	c	Load factor 28%.
"	m	75	e	50	3	35	n	
Windsor	p	275	e	162	2	105	n	
Wolfville	p	130	e	90	3	55	n	
"	p	50	o	45	3		a	
Yarmouth	p	400	h	360	3	275	c	1,000 h.p. unit to be installed. Head 27 ft. Use storage.
"	p	275	e	150	d.c.		a	
				150	3			
"	p	80	g	100	d.c.		a	
				120	3			
PRINCE EDWARD ISLAND								
Alberton	p	39	h	30	3		n	Head 14 ft.
Charlottetown	p	350	e	250	3	500	a	Load factor 60%. Cost of power at plant 2·5 c. per k.w.h.
"	p	482	g	375	3		c	
Crapaud	p	40	h	30	2		n	Head 11 ft.
Kensington	p	30	h	90	3	22	n	Head 12 ft.
Montague	p	80	h	72	3	52	n	Generation cost $6 per h.p.-yr. Head 20 ft.
North Tryon	p	18	h	36	1	11	n	Head 12 ft.
Summerside	p	125	e	180			a	Generation cost 9c. per k.w.h.
"	p	150	g	180		75	n	
NEW BRUNSWICK								
Aroostook	p	4,000	h	3,000	3	1,350	c	Load factor 80%. Head 75 ft.
Bathurst	p	1,000	h	200	3	80	c	Head 63 ft.
Campbellton	m	525	g	360	3	200	c	
Centreville	p	160	h	60	d.c.	20	n	Head 16 ft.
Chatham	m	480	o	340	3	150	c	Generation cost 2·3c. per k.w.h.
Chipman	p	100	e	25	d.c.			
Dalhousie	m	125	g	94	3	20	c	
Dorchester	p	75	e	72	1	33	n	
Edmundston	m	550	h	276	3	305	c	Head 20 ft.
Fredericton	p	266	e	678	2	350	c	Generation cost 3·5c. per k.w.h.
		520	t					
"	m	95	e	130	arc	50	n	
Marysville	p	100	e	62	3	10	n	Cost of power 8c. per k.w.h.
Moncton	p	1,200	e	720	2	880	c	Generation cost 2·75c. per k.w.h.
				250	d.c.			
Newcastle	m	350	e	270	2	150	n	Generation cost $60 per h.p.-yr.
Port Elgin	p	50	e	56	d.c.			
Richibucto	m	270	h	300	3	112	c	Head 21 ft.
Sackville	p	425	e	330	3	187	c	Load factor 7%.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
New Brunswick—*cont.*								
Shediac	p	108	h	90	3	50	n	Head 25 ft. Trouble, low flow.
St. John	p	3,333 3,000	t e	4,500 750	3 d.c.	3,000	c	
St. Stephen	p	875	h	600 70	3 d.c.	225	c	Head 12 ft.
Sussex	p	200	e	120	2	90	n	
Woodstock	p	500	h	480	3	375	c	Head 30 ft. Trouble, low flow.
"	p	300	e				a	
QUEBEC								
Actonvale	p	60	h	48	1	37	n	Head 8 ft. Trouble, low flow.
Amqui	p	379	h	300	3	70	c	Head 22 ft.
Baie St. Paul	p	290	h	360	2	150	n	Head 110 ft. Trouble, ice and low flow.
Bedford	p	100	h	60	1	43		Head 13 ft.
Buckingham	p	550	h	360	2	200	n	Gen. cost $10 per h.p.-yr. Head 50 ft.
Campbell Bay	p	90	h	72	3	15	n	Head 95 ft.
Chandler	p	2,666	t	2,400	3	1,400	c	Gen. cost 8 to 10c. per k.w.h. Load factor, 65%.
Chicoutimi	p	7,500	h	5,625	3	1,500	c	Head 53 ft. Use storage.
Coaticook	m	330	h	300	3	450	c	Gen. cost $15 per h.p.-yr. Head 40 ft.
"	m	320	h	300	3		a	Head 30 ft.
Cowansville	p	65	h	75	3	30	c	Head 25 ft.
Danville	p	210	h	108	1	25	n	Head 18 ft. Trouble, low flow.
"	p	150	e				a	
Deschambault	p	550	h	500	3		c	Head 48 ft.
Disraeli	p	80	h	90	1	32	n	Head 20 ft. Use storage.
"	p	4,000	h	3,060	3	2,500	c	Load factor 60%. Head 44 ft. Use storage.
"	p	1,750	e				a	
Dixville	p	40	h	30	d.c.	8		
Drummondville	p	425	h	324	3	200	c	Head 9½ ft. Use storage. New plant, 6,000 h.p., under construction.
East Angus	p	300	h	210	3	187	c	Gen. cost $12 per h.p.-yr. Head 25 ft. Trouble, ice.
Eustis	p		h	360				
Farnham	m	1,200	h	720	3	200	c	Head 31 ft. Trouble, low flow.
"	m	540	e				a	
Farm Point	p	200	h	180	3	150	c	Head 75 ft.
Foster	p	300	h	180	3	120	c	Head 24 ft. Trouble, low flow. Use storage.
Frelighsburg	p	92	h	25	d.c.	14		Head 21 ft.
"	p	40	e				a	
Gaspe	p	5	o	3	d.c.			
Granby	p	100	h	224	3	120	c	Head 14 ft. Trouble, low flow.
"	p	275	e				a	

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
Quebec—*continued*								
Grande Baie	p	950	h	810	3	200	c	Head 75 ft.
Grand'mère	m	900	h	600	3	150	c	Head 100 ft.
"	p	120,000	h	90,000	3	41,250	c	Head 83 ft. Use storage.
Hébertville	p	200	h	48	2	40	n	Head 22 ft.
Howick	p	70	h	72	3	52	n	Head 12 ft. Trouble, low flow and ice.
Hull	p	2,700	h	360 600 1,920	1 d.c. 3		c	Head 9 ft. Trouble, ice. Use storage.
"	m	1,100	h	750	2	350	c	Head 19 ft. Use storage.
Huntingdon	p	180	h	180	3	75	c	Head 26 ft. Trouble, ice.
"	p	150	e	90	1		a	
Joliette	m	315	h	120 30	2 arc	125	n	Head 20 ft. Trouble, low flow.
Jonquière	m	550	h	870	3	275	c	Head 45 ft. Trouble, low flow.
Lachute	p	250	h	144	2	225	n	Development partly complete for 3,000 h.p. Head 24 ft.
Lake Edward	p	35	e	18	d.c.	20	n	
Laurentides	p	300	h	336	3	90	c	Gen. cost $20 per h.p.-yr. Head 24 ft. Trouble, ice.
La Tuque	p	4,200	h	3,800	3	2,250	c	Head 80 ft.
Louiseville	p	175	h	120	3	100	c	Gen. cost $42 per h.p.-yr. Head 18 ft.
Magog	m	1,800	h	1,250	2	1,100	c	Head 21 ft.
Maniwaki	p	300	h	180	3	199	c	Head 13 ft.
Megantic	p	150	g	75	3	30	n	
Mont Joli	p	75	g	60	3	40	c	
Mont Laurier	p	150	h	125	3	75	c	Head 19 ft.
Montmagny	p	250	h	210	3	94	n	Head 20 ft.
Montreal:								
St. Timothée	p	28,800	h	20,000	3	22,500	c	Load factor 46%. Head 50 ft.
C.L. & P. Co. aux	p	2,000	t	1,800	3		a	
Chambly	p	24,800	h	19,200	2	16,000	c	Head 32 ft.
Lachine	p	15,600	h	12,000	3	10,000	c	Head 14 ft. Trouble, ice.
Soulanges	p	15,600	h	13,500	3	11,000	c	Head 50 ft.
Cedars Rapids	p	129,600	h	120,000	3	100,000	c	Load factor 87%. Head 30 ft.
M.L.H. & P. Co. aux	p	22,000	t	20,000	3		a	
Murray Bay	p	500	h	450	3	375	n	Gen. cost $15 per h.p.-yr. Head 65 ft.
New Glasgow	p	40	h	6	d.c.	5	n	Head 19 ft.
Ormstown	p	175	h	144	1	50	n	Head 11 ft.
Papineauville	p	350	h	300	3	150	c	Head 20 ft. Trouble, ice.
Philipsburg	p	625	e	370	d.c.		c	Gen. cost $55 per h.p.-yr.
Pont Rouge	p	96	h	60	3	30	c	Head 12 ft.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
Quebec—*continued*								
Quebec:								
Seven Falls	p	24,000	h	19,400	3	3,750	c	Head 410 ft. Use storage.
Montmorency	p	5,000	h	2,880	2	3,000	c	Head 208 ft.
				600	d.c.			
Natural Steps	p	2,000	h	1,800	2	1,500	c	Head 62 ft.
Valcartier	p	3,000	h	1,800	3	1,500	c	Head 33 ft. Use storage.
Chaudière	p	4,800	h	3,000	3	2,500	c	Head 114 ft.
Q.R.L.H. & P. Co. aux	p	1,800	e	1,260	2		a	
P.S. Co. aux	p	3,300	t	3,000	3		a	
Richmond	p	230	h	180	3	135	c	Head 32 ft.
Rimouski	p	600	h	480	2	150	c	Head 20 ft. Use storage.
Riviere du Loup	m	275	h	240	2	206	n	Head 92 ft. Use storage
Roberval	m	120	h	204	1	96	n	Cost of power $45 per h.p.-yr. Head 45 ft. Trouble, low flow.
Roxton Falls	p	107	h	60	1	45	n	Head 27 ft.
"	p	80	e				a	
Ste. Agathe	m	400	h	275	3	150	c	Head 50 ft.
St. Andrews	p	385	h	366	3	150	c	Head 15 ft. Trouble, low flow.
St. Anselme	p	65	h	60	2	25	n	Head 8 ft. Trouble, ice.
St. Césaire	p	300	h	144	2	112	c	Head 11 ft. Trouble, low flow.
St. Chrysostôme	p	3	o	1	d.c.	1	n	
St. Félicien	p	250	h	204	3	70	c	Head 70 ft.
St. George	p	350	h	300	3	75	n	Head 20 ft. Trouble, ice.
St. Hubert	p	9	h		d.c.		a	Head 12 ft. Trouble, low flow.
"	p	8	o					
St. Hugues	p	75	h	60	3	25	n	Head 27 ft. This plant may also be operated by steam.
"	p	100	g				a	
St. Hyacinthe	p	400	h	480	3	300	a	Head 14 ft. Trouble, low flow.
"	p	300	e				a	
St. Jérôme	m	540	h	300	3	250	c	Head 20 ft. Trouble, low flow and ice.
St. Johns	p	675	e	546	3	250	a	Cost of power, $22 per h.p.-yr.
St. Jovite	p	80	h	60	1	35	n	Head 40 ft.
St. Pie	p	75	h	62	3	22	n	Trouble, ice.
St. Raymond	m	100	h	90	3	75	c	Head 15 ft.
St. Rémi	p	150	e	30	3	30	c	
St. Roch l'Achigan	p	90	h	108	1	22	n	Head 14 ft.
St. Scholastique	p	100	h	72	3	40	n	Head 50 ft. Trouble, low flow.
St. Tite	p	70	h	180	3	26	n	Head 22 ft.
St. Ulric	p	45	h	36	3	22	n	Head 23 ft.
St. Vincent de Paul	p	155	e	78	d.c.	50	c	
Sawyerville	p	85	h	36	1	15	n	Head 18 ft.
Scotstown	p	203	h	90	3	67	n	Head 22 ft.
Shawinigan Falls:								
S. W. & P. Co. No. 1	p	58,500	h	46,140	2	90,000	c	Use storage. Load factor 50%. Head 145 ft.
S. W. & P. Co. No. 2	p	90,000	h	75,000	3		c	
St. M. L. & P. Co.	p	300	h	240	3	200	c	Head 90 ft.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
Quebec—*continued*								
Shawville	m	18	o	12	d.c.	9	c	Storage battery used.
Sherbrooke:								
Rock Forest	m	2,900	h	2,500	3	3,000	c	Head 32 ft.
Weedon	m	1,250	h	750	3		c	Head, Weedon plant, 30 ft. Head, Frontenac plant, 39 ft. Both use storage; cost of power $25 per h.p.-yr.
Frontenac	m	5,400	h	3,000	3		c	
Sou. Can. Power Co.	p	4,050	h	3,420	3	2,300	c	Head 58 ft. Load fac. 60%.
Shipshaw	p	10,500	h	8,100	3		c	Gen. cost, approx., $8.50 h.p.-yr. Head 90 ft. Use storage.
Stanbridge East	p		h	17	d.c.		n	Head 9·5 ft.
Three Rivers	p	1,350	h	1,320	3	1,100	c	Head 50ft.
Valleyfield	p	250	h	200	3	101	c	Head 10 ft. Trouble ice. Load fac. 50%.
Verdun	m	600	e	564	3	470	a	
Westmount	m	1,500	e	1,110	3	1,200	c	Load factor 37%.
West Shefford	p	100	h	40	1	10	n	Head 8 ft.
ONTARIO								
H.E.P.Commission:								
Severn System	m	3,900	h	2,700	3	2,400	c	Load factor 80%. Generation cost $14 per h.p.-yr. Head 58 ft.
Wasdell System	m	1,200	h	800	3	600	c	Load factor 92% Generation cost $17 per h.p.-year. Head 12ft.
Eugenia System	m	4,500	h	2,822	3	3,150	c	Load factor 85%. Generation cost $16 per h.p.-yr. Head 540 ft. Use storage.
Muskoka System	m	1,760	h	1,200	3	712	c	Load factor 75%. Head 105 ft.
Central Ont. System:								
Trenton	m	5,600	h	3,748	3	3,700	c	Load factor 65%. Head 20 ft. Use storage.
Frankford	m	4,800	h	3,120	3	2,620	c	Load factor 30%. Head 18 ft. Use storage.
Campbellford	m	5,500	h	3,750	3	2,900	c	Load factor 65%. Head 23 ft. Use storage.
Healey Fall.	m	11,200	h	7,500	3	7,600	c	Head 76 ft. Use storage. Trouble, low flow.
Peterborough	m	2,850	h	1,875	3	1,980	c	Load factor 71%. Head 18 ft. Use storage.
Fenelon Falls	m	1,000	h	800	3	760	c	Load factor 40%. Head 24 ft. Use storage. Trouble, low flow.
Nipissing System	m	2,200	h	1,080	3	675	c	Load factor 60%. Head 92 ft.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
Ontario—*continued*								
Alexandria	m	200	e	120	2	73	n	Generation cost 1c. per h.p.-hr.
Alliston	p	150	h	72	2	53	n	Head 22 ft.
"	p	150	e				a	
Almonte	m	360	h	300	3	75	c	Generation cost $22 per h.p.-yr. Head 25 ft. Use storage.
Alvinston	p	40	e	35	d.c.		n	
Arkona	p	120	h	90	3			
Arnprior	p	1,400	h	800	3	450	c	Head 22 ft. Use storage.
Aylmer	m	200	e	120 25	d.c.		n	
Bancroft	p	75	h	40	d.c.	40	n	Head 18 ft.
Beeton	m	65	e	30	1	25	n	
Blind River	p	250	h	250	3	94	c	Head 60 ft.
Blyth	m	45	e	36	1	26	n	
Bobcaygeon	m	200	h	120	3	64	n	Head 6 ft.
Bracebridge:								
No. 2	m	810	h	660	2	1,150	c	Head 36 ft.
No. 3	m	900	h	720	2		c	Head 42 ft.
Brockville	m	1,120	e	960	3		a	Generation cost 2·52c. per k.w.h.
Bruce Mines	m	50	e	54	1	26	n	
Brussells	m	100	e	120	2	60	n	
Burks Falls	p	120	h	144	1	70	n	Head 27 ft. Trouble, low flow and ice.
Calabogie	p	9,000	h	6,600	3		c	Head 30 ft.
Campbellford	m	3,300	h	2,400	3	1,462	c	Head 25 ft.
Cardinal	p	550	e	250				
Cargill	p	100	h	85	d.c.	45	n	Head 16 ft. Trouble, low flow.
Carleton Place	p	840	h	480	3*	450	c	Head 11 ft. Use storage. Generation cost $22 per h.p.-yr.
Casselman	p	500	h	360	3		c	Head 35 ft. Trouble, low flow.
Chapleau	p	400	h	240	3	75	c	Head 28ft. Use storage
Chatham	p	1,520	g	250	d.c.	450	c	Load factor 65%. Generation cost 0·75c. per k.w.h.
"	p	400	e	949 330	2 2		c	
Cobalt:								
Hound Chute	p	5,340	h	3,500	3	12,000	c	Head 32 ft. Use storage.
Fountain Fall	p	3,000	h	2,500	3		c	Load factor 82%. Head 30 ft. Use storage.
Matabitchuan	p	11,000	h	7 500	3		c	Head 312 ft.
Cobden	m	135	h	100	3	30	c	Head 48 ft. Use storage.
Cochrane	p	400	g	420	3		c	Generation cost 5c. per k.w.h.
Copper Cliff:								
No. 1	p	13,100	h	8,000	3	9,500	c	Head 85 ft. at each plant. Use storage. Load factor 69%.
No. 2	p	7,500	h	5,555	3		c	

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
Ontario—*continued*								
Cornwall:								
S.E.L. & P. Co.	p	150	h	180	3	90	a	Head 21 ft. Trouble, ice.
St. Law. P. Co.	p	2,500	h	2,400	3	1,725	c	Head 30 ft.
Delhi	p	290	h	336	3	80	c	Head 22 ft. Generation cost 4c. per k.w.h.
Dryden	p	1,600	h	1,800	3			Head 45 ft.
Eganville	p	195	h	180	3	100	n	Head 10 ft.
Elk Lake	p	350	h	120	3	100	n	Generation cost 6c. per k.w.h. Head 15 ft.
Englehart	p	1,080	h	800	3	600	c	Head 38 ft.
Espanola	p	4,950	h	3,750	3	2,250	c	Head 63 ft.
Fenelon Falls	m	600	h	480	3	200	c	Head 24 ft.
Fort Frances	p	6,800	h	5,000	3		c	Head 28 ft.
Fort William	p	34,100	h	23,475	3	11,600	c	Generation cost 0·45c. per k.w.h., approx. Load factor 25.4%. Head 178 ft. Use storage.
Frankford	p		h	60	3			Head 12½ ft.
Gananoque	p	200	h	150	d.c.	150	c	Load factor 40%. Head 14 ft. Use storage.
"	p	250	e	150	d.c.		a	
Glencoe	m	96	g	90	3	60	n	
Gowganda	p	800	h	768	3	600	c	Generation cost $31.95 per h.p.-yr. Head 29 ft. Use storage.
Guelph	m	200	h	180	3		a	Head 12 ft.
Hamilton:								
Power Glen	p	55,300	h	52,680	3		c	Head 270 ft. Trouble with ice.
Brantford	p	1,100	h				c	Head 33 ft.
Steam auxiliary	p	26,667	t	24,000	3		a	
Hastings	p	90	h	180	2	60	n	Generation cost $12 per h.p.-yr. Head 9 ft. Use storage. Trouble, ice.
Havelock	p	150	h	120	3	100	n	Head 19 ft. Use storage.
"	p	300	e				a	
Hawkesbury:								
Table Fall	p	1,750	h	1,380	3	500	c	Head 28 ft. Trouble, ice.
Bell Fall	p	4,800	h	4,000	3	1,875	c	
Helen Mine	p	2,600	h	1,800	3	790	c	Head 67 ft. Trouble, low flow.
Iroquois:								
Municipal	m	225	h	125	3	86	c	Head 12 ft.
Beach Co.	p	500	h	480	3		c	Head 13 ft.
Iroquois Falls	p	8,000	h	5,000	3	4,650	c	Head 42 ft. Use storage.
Kemptville	p	300	h	300	3	175	c	Head 12 ft. Generation cost $10 per h.p.-yr.
Kenora	m	3,400	h	3,000	3	2,500	c	Head 20 ft. Use storage.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
Ontario—*continued*								
Kincardine	m	250	e	180	3	100	n	
Kingston	m	667	t	600	3		a	Generation cost 1·25c. per k.w.h.
Kingston Mills	p	900	h	600	3		c	Head 45 ft.
Lakefield	p	125	h	90	3	75	c	Generation cost $13 per h.p.-yr. Head 12 ft. Use storage.
Little Current	m	100	e	90	2	19	n	Generation cost 15c. per k.w.h.
London	p	700	e	495	d.c.	350	c	Generation cost 0·50c. per k.w.h.
Lucknow	p	100	e	60	d.c.	32	n	
Lyndhurst	p	200	h	36	3		n	Head 17·5 ft.
Markham	m	65	e	86	2	22	n	
Marksville	p		e	36				
Marmora	m	100	h	120	1	75	n	Head 13 ft.
Mattawa	p	216	h	240	3	75	n	Generation cost $14.50 per h.p.-yr. Head 13 ft.
Meaford	p	400	h	240	3		c	Head 50 ft.
Merlin	p	50	g	40	d.c.	12	n	
Merrickville	p	750	h	562	3	120	c	Head 26·5 ft.
Michipicoten	p	1,700	h	1,260	3	800	c	Head 128 ft.
Mine Centre	p	9	o	5	d.c.		c	Storage battery used.
Mitchell	m	120	e	90	2			
Morrisburg:								
No. 1	m	300	h	228	3	187	c	Head 10 ft.
No. 2	m	1,400	h	990	3		a	Head 10 ft.
Mount Albert	p	65	g	30	d.c.		n	
Niagara Falls:								
H. E. P. Com. (Ont. Pr. Co.)	m	211,300	h	180,600	3	120,000	c	Load factor 91%. Head 180 ft.
Can. Nia. Pr. Co.	p	112,500	h		3	75,000	c	Head 141 ft.
Toronto Power Co.	p	165,000	h	132,000	3	93,250	c	Load factor 100%. Head 140 ft.
International Ry. Co.	p	4,000	h	2,500	d.c.	1,600	c	Load factor 29%. Head 64 ft.
Norwood	p	75	e	36	1		n	
Orangeville:								
Cataract El. Co.	p	375	h	300	3	200	c	Generation cost $30 per h.p.-yr. Load factor 60%. Head 75 ft.
"	p	150	e	180	3		a	
Orillia	m	6,360	h	4,500	3	3,600	c	Load factor 80%. Head 47 ft.
Ottawa:								
O. & H.Pr. & Mfg. Co.	p	12,600	h	5,400 6,000	2 3	9,000	c	Head 32 ft. Use storage.
O.E. Co. No. 1	p	4,400	h	2,800	2	6,500	c	Head, No. 1, 28 ft.; No. 2, 33 ft. Use storage. Load factor, 52%.
O.E. Co. No. 2	p	5,400	h	3,900	2		c	
O.E. Co. auxiliary	p	6,267	t	5,640	2		a	
Owen Sound	m	1,000	e	960	3		a	
Paisley	p	135	h	90	2	49	n	Head 12 ft. Trouble, low flow.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
Ontario—*continued*								
Pakenham	p	100	h	60	2	30	n	Head 14 ft.
Parkhill	p	100	e	44	d.c.	32	n	
				20	arc			
Parry Sound	m	600	h	510	3	460	c	Head 20 ft. Use storage.
Pembroke	p	3,600	h	2,700	3	1,400	c	Load factor 75%. Head 130 ft.
"	p	350	e	270	3		a	
Perth:								
Glen Tay plant	m	175	h	180	2	187	c	Head 10 ft. Trouble, low flow.
Badour plant	m	250	h	259	2		c	Head 16 ft. Trouble, low flow.
Steam plant	m	250	e	180	2		a	
Street lighting	m	125	h	40	arc	20	n	Head 12 ft. Trouble, low flow.
Peterborough	p	3,600	h	2,700	3	2,500	c	Head 27 ft. Trouble, ice.
Picton	m	375	e	282	2	161	c	
Port Arthur	m	1,900	h	1,392	3	2,317	a	Head 85 ft. Use storage.
Port Carling	p	10	o	25	d.c.			
Port Perry	m	75	e	72	1	25	n	
Prescott	m	225	e	180	3		a	
Rainy River	p	250	e	120	3		n	
Renfrew:								
No. 1	m	800	h	500	2	712	c	Load factor 80%. Head 38 ft. Use storage.
	m	300	e	200	2		a	
No. 2	m	1,000	h	840	2	637	c	Load factor 80%. Head 35 ft. Use storage.
Rockland	p	75	e	60			n	
Sandwich	m	1,000	t	900	3	505	c	Generation cost 1·6c. per k.w.h. Load factor 36·8 %.
Sault Ste. Marie	p	21,333	h	17,400	3	2,700	c	Load factor 74% Head 18 ft.
				1,500	d.c.			
Sellwood	p	1,000	t	900	3		a	
Smiths Falls:								
No. 1 system	m	300	h	162	3	115	c	Head 9 ft. Trouble, ice.
"	m	125	e				a	
No. 2 system	m	600	h	330	3	300	c	Head 16 ft.
"	m	500	e				a	
Southampton	p	350	h	240	3		c	Head 11 ft. Trouble ice.
"	p	200	e				a	
South River	p	460	h	260	3	90	c	Head 64 ft.
Stouffville	m	60	g	48	1	25	n	
Streetsville	m	120	h	144	3	75	n	Head 12 ft. Trouble, low flow.
Sturgeon Falls	p	3,239	h	2,322	3	1,935	c	Generation cost $15 per day.
Sudbury:								
No. 1 plant	p	6,600	h	5,460	3	4,550	c	Head 52 ft.
No. 2 plant	p	3,600	h	3,000	3		c	Head 38 ft.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
Ontario—*continued*								
Sutton West	p	100	h	32	d.c.		n	Head 11·5 ft. Trouble, low flow.
Tamworth	p	35	h	28	d.c.		n	Head 11 ft.
Teeswater	p	50	h	54	1	22		Head 14 ft.
"	p	50	e	30	2		a	
Thedford	p	80	e	48	1	15	n	Generation cost 7c. per k.w.h.
Thessalon	m	80	e	72	1	60	n	
Thornbury	m	75	h	72	1	37	n	Head 20 ft.
Thorold	m	220	h	144	1	187	c	Head 12 ft.
Timmins:								
Wawaitin plant	p	10,400	h	10,500	3	7,000	c	Head, Wawaitin, 125 ft. Sandy Falls, 33 ft. Both use storage. Load factor 85%.
Sandy Falls plant	p	5,000	h	4,530	3		c	
Toronto	p	19,333	t	17,400	3		a	
Toronto Township	m	1,700	h	1,440	3	975	a	Head 45 ft.
Tottenham	m	75	e	47	d.c.	21	n	
Uxbridge	p	75	e	60	1	35		
Walkerton	p	395	h	225	3	187	c	Generation cost $30 per h.p.-yr. Head 12·5 ft.
Warkworth	p	80	h	86	2	37	n	Head 20 ft.
Wellington	p	75	g	45	d.c.		n	
Westport	p	286	h	240	3	60	n	Head 29 ft.
Wheatley	p	51	g	25	d.c.	20	n	
Wiarton	p	250	h	240	3	140	c	
Windsor	p	1,500	e	1,320	3	600	c	Generation cost 1c. per k.w.h. Load factor 80%.
Wingham	m	200	h	180	3	150	c	
"	m	350	e	404	3		a	
Woodstock	m	440	e	480	3		a	
Wroxeter	m	60	h	60	1	14	n	Head 10 ft.
"	m	40	e				a	
Yarker	p		h	12	d.c.			Head 26 ft.
MANITOBA								
Boissevain	m	75	e	90	2	56	n	
Brandon	p	3,206	e	2,160	3	1,550	c	Generation cost, incl. overhead chgs., 5·13c per k.w.h.
"	p	1,000	h	720	3		a	Head 30 ft.
Carberry	m	95	e	90	2	35	n	
Carman	m	175	e	88	d.c.	60	n	Generation cost 14c. per k.w.h.
Dauphin	m	537	e	468	2	140	c	Generation cost 5·25c. per k.w.h.
Killarney	p	100	e	90	3	50	n	Generation cost 11c. per k.w.h.
Melita	m	60	e	38	d.c.		n	
Minnedosa	p	450	h	360	3	65	c	Head 19 ft. Trouble, low flow.
Morden	m	150	e	90	1	35	n	Generation cost 12c. per k.w.h.
Neepawa	m	293	e	250	3	135	c	Generation cost 8c. per k.w.h. Load factor 20%.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
Manitoba—*continued*								
Portage la Prairie	m	900	e	600	3	525	c	Generation cost 1·8c. per k.w.h. Load factor 30%.
Rapid City	m	50	g	30	3		n	
Reston	m	40	o	24	d.c.		c	Storage battery used.
Russell	m	75	g	60	3	35	n	
Shoal Lake	m	55	o	30	d.c.		c	
Souris	m	164	g	80	d.c.	67	c	Generation cost 0·58c. per k.w.h.
The Pas	m	240	o	240	3	110	n	
Winnipeg Beach	p	50	e	120	3			Operated only in summer.
Winnipeg	m	46,400	h	36,000	3	21,000	c	Generation cost $9.00 per h.p.-year. Head 46 ft. Load factor 44.6%.
"	p	30,700	h	25,200	3	23,000	c	Head 39 ft. Load factor 66·6%. Trouble, ice.
"	p	6,200	e	3,000 1,650	3 d.c.		a	
"	p	12,000	t	10,800	3		a	
SASKATCHEWAN								
Arcola	p	65	o	102	1		n	
Assiniboia	m	50	o	90	3		n	
Big River	p	1,500	e	1,150	3		c	
Borden	p	12	o	10	d.c.	10	n	
Broadview	m	75	g	50	3		n	
Canora	m	96	o	76	3	63	n	Generation cost 10c. per k.w.h.
Carlyle	m	52	e	42	3		n	Generation cost 17c. per k.w.h.
Davidson	m	190	g	111	3		n	Generation cost 9c. per k.w.h.
Earl Grey	m	15	o	10	d.c.	9	n	
Eastend	p	25	o	15	d.c.		n	Generation cost 12c. per k.w.h.
Estevan	m	325	e	225	3	150	c	Generation cost 4·44c. per k.w.h. Load factor 38%.
Fort Qu'Appelle	p	25	o	15	3	12	n	Generation cost 18c. per k.w.h.
Govan	p	20	o	12	d.c.	14	n	
Grenfell	m	79	g	45	3		n	
Gull Lake	p	64	g	36	3	30	n	
Herbert	p	60	g	30	3	40	n	Generation cost 12c. per k.w.h.
Humboldt	m	250	e	167	3	110	n	Generation cost 5·36c. per k.w.h.
Indian Head	m	225	e	180	3	130	n	Generation cost 8c. per per k.w.h.
Kamsack	m	200	g	125	3	94	n	Generation cost 5·5c. per k.w.h.
Kindersley	m	125	e	75	3	55	n	Generation cost 12c. per k.w.h.
Lang	p	10	o	6	d.c.			

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
Saskatchewan—*cont.*								
Langham	m	50	g	36	3	28	n	Generation cost 16c. per k.w.h.
Lashburn	p	25	o	15	d.c.		c	Generation cost 13c. per k.w.h.
Leader	p	62	o	40	d.c.		n	
Lloydminster	p	100	g	65	d.c.		c	Generation cost 6·5c. per k.w.h. Storage battery used.
Lumsden	p	40	o	25	3	14	n	Generation cost 19c. per k.w.h.
Maple Creek	p	100	e	90	3	85	n	New unit being installed to give continuous service.
Melfort	m	150	o	100	3		n	Generation cost 3c. per k.w.h.
Melville	m	285	g	276	3		c	
Milestone	p	25	o	20	d.c.		n	Fuel cost for generation 2c. per k.w.h.
Moose Jaw	m	4,000	t	3,600	3	1,950	c	Generation cost, incl. overhead chgs. 2·21c. per k.w.h. Load factor 38·2%.
Morse	p	68	g	36	3		n	Generation cost 10c. per k.w.h.
North Battleford	m	950	e	912	3	400	c	Fuel cost of generation 1c. per k.w.h.
Outlook	m	75	g	60	3	50	n	Generation cost 18c. per k.w.h.
Oxbow	m	25	o	20	d.c.	17	c	Storage battery used.
Ponteix	p	20	o	10	d.c.		n	
Prince Albert	m	1,520	e	892	3	570	c	Generation cost 2·85c. per k.w.h. Load factor 50%.
Qu'Appelle	p	100	g	130	d.c.		n	
Radisson	m	33	o	25	d.c.	16	c	Storage battery used.
Regina	m	8,000	t	7,200	3	4,200	c	Generation cost 1·93c. per k.w.h. Load factor 30%.
Rosetown	p	75	o	72	3	40	n	
Rosthern	m	40	o	30	3	25	n	
Rouleau	m	170	g	90	3	32	n	
Saltcoats	m	63	g	60	3		n	
Saskatoon	m	6,933 t 1,000 e		7,140	2	3,600	c	Load factor 35·2%. Generation cost 2·7c. per k.w.h.
Scott	m	100	o	90	3	45	n	Generation cost 10c. per k.w.h.
Semans	p	24	o	18	d.c.	12	n	Generation cost 10c. per k.w.h.
Shaunavon	p	25	o	15	d.c.	12	c	Storage battery used.
Strassbourg	m	50	g	37	3	28	n	
Swift Current	m	265	g	204	3		a	Generation cost 1·5c. per k.w.h.
" "	m	900	e	720	3	350	c	Load factor 50%. Generation cost 2·5c. per k.w.h.
Tisdale	p	125	e	72	3		n	

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
Saskatchewan—*cont.*								
Tugaske	p	2	o		d.c.		c	Storage battery used.
Wadena	m	65	g	36	3	28	n	Generation cost 16·4c. per k.w.h.
Watrous	p	90	g	60	3	30	n	
Watson	p	10	o	7	d.c.		n	
Weyburn	m	580	e	360	3	290	c	Generation cost 2c. per k.w.h.
Wilcox	p	10	o	7	d.c.		n	
Wilkie	m	100	o	90	3		n	Generation cost 3c. per k.w.h.
Wolseley	m	150 50	g o	120 30	3		n	Generation cost, incl. overhead chgs., 12c. per k.w.h.
Yellowgrass	m	25	o	17	d.c.		c	Generation cost 6c. per k.w.h. Storage battery used.
Yorkton	m	650	o	510	3	350	c	Generation cost 3c. per k.w.h.
ALBERTA								
Bankhead	p	1,000	e	300	3		c	
Bassano	p	100	g	62	3	46	n	
Bellevue	p	650	e	600	3		c	Generation cost $73 per h.p.-year.
Blairmore	m	100	e	75	3	40	c	Generation cost $120 per h.p.-yr.
Bowness	p	350	g	234	3	300	c	Generation cost, incl. overhead chgs., 1·75c. per k.w.h.
Calgary:								
Calgary Power Co.	p	19,500	h	13,000	3	7,500	c	Head 70 ft. at each plant. Generation cost, including overhead charges 0·0958c. per k.w.h. Use storage. Load factor 92%.
" "	p	11,600	h	7,500	3		c	
Municipal auxiliary	m	13,528 2,900	t e	12,875 1,200	3 d.c.	5,350	a	Generation cost 0·952c. per k.w.h.
Calgary Water Pr. Co.	p	780	h	720	3	600	a	Head 10 ft. Trouble, low flow.
" " "	p	1,056 1,150	t e	950 1,032	3 3	1,400	c	Generation cost 2c. per k.w.h. for steam plant, and 1·5c. for combined steam and hydro-electric plants. Load factor 75%.
Camrose	m	275	e	210	3	100	c	Generation cost 9c. per k.w.h.
Canmore	p	700	e	624	3	390	c	Generation cost 1·25c. per k.w.h. Load factor 66%.
Cardston	m	75	e	90	2	75	n	
Carmangay	m	75	e	50	d.c.	40	n	Generation cost 15c. per k.w.h.
Claresholm	m	200	e	150	3	115	n	
Coleman	p	1,050 990	t e	945 500	3 d.c.	750	c	Generation cost 2·18c. per k.w.h. Load factor 50%.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
Alberta—*continued*								
Coronation	m	120	e	75	3	26	n	
Didsbury	m	100	e	60	3	40	n	Generation cost 10c. per k.w.h.
Drumheller	p	150	e	100	3	82	n	
Edmonton	m	10,667 3,567	t e	10,800 1,550	3 d.c.	6,200	c	Generation cost, incl. overhead chgs., 0·7c. per k.w.h. Plant operated by private company. Load factor 34·4%.
Fort Saskatchewan	m	100	e	86	2	31	n	Generation cost 8c. to 17·5c. per k.w.h.
Frank	p	750	e	570	3	475	c	Generation cost $30 per h.p.-year.
Gleichen	m	40	e	25	d.c.	22	n	
Hanna	p	130	e	84	3	40	n	
Hardisty	p	50 12	g o	35 8	d.c. d.c.	35	n	
High River	m	277	e	132	3	55	c	Generation cost 6·8c. per k.w.h.
Hillcrest	p	580	e	494	3	200	c	
Innisfail	m	100	e	66	3	15	n	
Lacombe	m	100	h	72	3	60	n	Head 22 ft. Trouble, low flow.
"	m	155	e	120	3		a	Generation cost 10c. per k.w.h.
Lethbridge	m	2,000 1,160	t e	2,760	2	1,210	c	Generation cost 1·18c. per k.w.h. Load factor 40%.
Macleod	m	630	e	370	3	225	c	
Magrath	p	100	e	60	3	22	n	Generation cost 15c. per k.w.h.
Medicine Hat	m	3,333	t	3,000	3	1,100	c	Generation cost 1·5c. per k.w.h. Load factor 50%.
" "	m	400	g	329	3		a	
Nanton	m	125 75	e g	90	3		n	
Nordegg	p	460	e	370		370	c	Generation cost 4c. per per k.w.h. Load factor 80%.
Okotoks	p	80	g	37	3	30	n	
Olds	p	75	g	42	3	28	n	
Oyen	p	30	e	20	d.c.	22	n	
Pincher Creek	m	280	e	144	3	35	n	Generation cost 6·5c. per k.w.h.
Pocahontas	p	210	e	312	3	175	c	Generation cost 3c. per k.w.h.
Ponoka	m	350	e	250	d.c.	88	c	
Raymond	p	112	e	96	3	30	n	
Red Deer	p	445	e	384	3	120	c	Generation cost 6·5c. per k.w.h. Load factor 24%.
Stettler	m	200	e	180	3		c	Generation cost 2.75c. per k.w.h.
Taber	p	900	e	500	d.c. 3	425	c	Generation cost $35 per h.p.-year.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
Alberta—*continued*								
Vegreville	m	210	e	157	3	150	c	Generation cost 5c. per k.w.h.
Vermilion	p	75	e	60	3		n	
Vulcan	p	75	e	62	3		n	
Wainwright	p	75	e	36	3	30	n	
Wetaskiwin	m	190 550	g e	602	2		c	Generation cost 2·1c. per k.w.h. Load factor 32%.
BRITISH COLUMBIA								
Anyox	p	2,800	h	1,876	3	5,000	c	Head 385 ft. Generation cost, 0·25c. per k.w.h. Cost of power from combined hydro and steam plants 1·5c. per k.w.h. Load factor 60%.
"	p	6,944	t	6,250	3		c	
Armstrong	m	150	h	108	3	50	c	Trouble, low flow
"	m	200	o	150	3		a	Head 550 ft.
Ashcroft	p	90	o	90	3	13	n	Generation cost 19c. per k.w.h.
Britannia Beach	p	15,000	h	7,500	3	4,875	c	Use storage. Heads 1,820 and 740 ft.
"	p	3,333	t	3,000	3		a	
Chase	p	150	e	180	1&3	50	n	
Coal Creek	p	600	e	497	d.c.	300	c	Generation cost 2·6c. per k.w.h.
Copper Mountain	p	650	e	500	3	333	c	Generation cost 2c. to 2·25c per k.w.h.
Cranbrook	p	550	e	390	2	93	c	Generation cost 8c. per k.w.h.
Cumberland	p	12,000	h	8,800	3	3,700	c	Generation cost 0·13c. per k.w.h. Use storage. Head 275 ft. Load factor 81·7%.
Duncan	m	200	o	144	3	50	c	
Enderby	p	100	e	90	1	75	n	Generation cost 7c. per k.w.h.
Fernie	m	250	e	180	2	150	c	Generation cost 6·18c. per k.wh. Load factor 29%.
Fraser Mills	p	3,000	t	2,700	3	1,750	c	
Golden	p	1,333 150	t e	1,200 180	3		n	
Greenwood	p	150	h	144	3	85	c	Trouble, low flow. Head 150 ft.
Hedley	p	2,100	h	1,250	3	1,200	c	Head 67 ft. Load factor 85%.
Kamloops	m	2,400	h	1,500	3	1,500	c	Cost of generation and transmission 3c. per k.w.h. Trouble, ice. Head 190 ft. Load factor 60%.
" "	m	2,400	t	2,160	3		a	

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers		Electric generators		Max. load, K.W.	Service	Remarks
		H.P.	Kind	K.V.A.	Ph.			
British Columbia—*continued*								
Kaslo	m	250	h	144	2	135	c	Generation cost $75 per h.p.-yr. Trouble, ice and low flow. Head 41 ft.
Kelowna	m	620	e	400	3	195	c	Generation cost 6c. per k.w.h. Load factor 15%.
Ladysmith	m	125	e	138	3	63	n	
Merritt	m	200	e	150	3	125	n	
Michel	p	800	e	500	d.c.	264	c	Generation cost 2·6c. per k.w.h.
Mill Creek	p	300	h	200	d.c.	200	c	Head 600 ft.
Mission	p	70	h	55	3	23	c	Head 125 ft.
Nanaimo	p	450	h	420	3	410	c	Load factor 34%. Head 160 ft. Trouble, low flow. Use storage.
"	p	450	e	360	3		a	
Naramata	p	60	h	24	1		n	Head 250 ft. Plant is sometimes shut down temporarily owing to wants of irrigation.
Nelson	m	3,400	h	2,100	3	1,500	c	Generation cost 2·25c. per k.w.h. Head 54 to 62 ft. Load factor 60%.
New Denver	p	55	h	112	3	45	n	Head 82 ft.
Ocean Falls	p	10,000	h	8,940	3	7,000	c	Generation cost incl. depreciation $5 per h.p.-yr. Head 118 to 151 ft. Load factor 90%.
Peachland	m	100	h	60	3	30	n	Generation cost 2c. per k.w.h. Head 160 ft.
Penticton	m	200	o	120	3	96	n	Generation cost, incl. overhead chgs., 5c. per k.w.h.
Port Alberni	m	150	o	100	3	50	n	Generation cost, exclusive overhead chgs., 4·5c. per k.w.h.
Powell River	p	9,600	h	8,280	3	5,000	c	Head 147 ft.
Prince George	m	300	o	192	3	80	n	
Prince Rupert	m	1,650	h	1,125	3	375	c	Generation cost 3c. per k.w.h. Head 253 ft. Load factor 50%.
" "	m	480	e	300	3		a	
Princeton	p	75	e	60	3			
Quatsino	p	2,400	e	2,100	3	1,750	c	
Revelstoke	m	2,300	h	1,440	3	415	c	Generation and distribution cost 3c. per k.w.h. Head 74 ft. Load factor 25%. Trouble, ice.
" "	m	250	g	300	3		a	
Rossland:								
No. 1 Bonnington	p	4,052	h	3,600	3	3,000	c	Head 34 to 46 ft. Load factor 100%.

TABULATED SUMMARY OF POWER PLANTS—*continued*

Place under which described	Ownership	Prime movers H.P.	Prime movers Kind	Electric generators K.V.A.	Electric generators Ph.	Max. load, K.W.	Service	Remarks
British Columbia—*continued*								
Rossland—continued								
No. 2 Bonnington	p	34,000	h	26,250	3	20,000	c	Head 70 ft. Load factor 89%.
Cascade plant	p	3,900	h	2,700	3	2,000	a	Head 156 ft. Generation cost at above three plants $15 per h.p.-yr.
Salmon Arm	m	150	o	120	3	22	n	Generation cost 6·8c. per k.w.h.
Sandon	p	175	h	70	d.c.	30	n	Head 400 ft. Trouble, low flow.
Sicamous	p	80	e	60	d.c.			
Spence Bridge	p	200	h	90	3	4	n	Head 200 ft.
Summerland	m	42	h	36	2	28	n	Generation cost 6·8c. per k.w.h. Head 400 ft.
Swanson Bay	p	625	h	540	3	450	c	Head 130 ft.
Vancouver:								
B.C. El. Ry. No. 1	p	43,500	h	25,200	3	43,250	c	Head 400 ft.
B.C. El. Ry. No. 2	p	40,500	h	26,700	3		c	Head 400 ft.
B.C. El. Ry. auxiliary	p	17,333	t	15,600	3		a	
West Power Co. of Can.	p	39,000	h	27,000	3	24,000	c	Head 105 ft. Load factor 55%.
Vernon	m	725	o	630	3		c	Generation cost, incl. overhead chgs., 4·5c. per k.w.h.
Victoria:								
Jordan plant	p	25,000	h	19,200	3	8,450	c	Generation cost 0·07c. per k.w.h. Head 1,145 ft. Load factor 64%. Use storage.
Goldstream plant	p	4,200	h	2,640	3		a	Generation cost 0·47c. per k.w.h. Head 650 ft. Use storage.
Auxiliary	p	4,444	t	4,000	3		a	Generation cost 3·87c. per k.w.h.
Walhachin	p	15	o	10	d.c.			Service temporarily discontinued.
YUKON								
Dawson:								
Can. Klondyke P. Co.	p	10,000	h	6,000	3	4,000	c	Generation cost 1·22c. per k.w.h. Head 228 ft. Trouble, low flow and ice.
Dawson E. L. & P. Co.	p	167	t	150	3	167	a	Generation cost 7·6c. per k.w.h.
Whitehorse	p	60	e	15	d.c.		n	Generation cost 11c. per k.w.h.

TABLE II

ELECTRIC PLANTS IN CANADA—TABULATED SUMMARY OF TRANSMISSION LINES OF 10,000 VOLTS AND OVER

Abbreviations:

Conductors: a=aluminium; c=copper; s=steel or iron.

Lightning Protection: e=electrolytic or aluminium arresters; g=grounded overhead wire; h=horn-gap arresters; l=low-equivalent arresters; m=multigap arresters; r=resistance-type arresters.

Described under	Organization	Voltage, kilo-volts	Cycles	Gauge number and material of conductors	Total mileage	No. of circuits	Value per mile, dollars	Lightning protection
NOVA SCOTIA								
Amherst	Canada El. Co	11	60	c	25	..	.	e
Halifax	N.S. Tram. Power Co	13.2	60	4 c	4	1		e
Sydney	C.B. El. Co	22	60	4 & 6 c	35	1	..	m e
Yarmouth	Yarmouth Lt. & Power Co	20	60	4 c	20	1	1,500	l
NEW BRUNSWICK								
Aroostook	Maine & N.B. Power Co	11	60	2 to 4 c	10*	1 & 2	..	e m
Edmundston	Municipality	15	60	4 c	10.3	1	874	m
Richibucto	Municipality	11	60	6 c	12	1	600	
QUEBEC								
Amqui	Cie. El. d'Amqui	10	60	..	30	.	780	..
Chicoutimi	Soc. d'E. & d'E. El. du S	12.5	60	0000	4	1	4,000	e
Disraeli	St. Francis W. P. Co	15	60	4 c	37	1 & 2	.	l
Granby	Southern Can. Power Co.	48	60	$\frac{5}{16}$ in. s	60	1	..	..
Grand'mère	Municipality	11	60	8 c	10	1	1,200	m
Hull	Hull El. Co	10	60	2 & 4 c	9	1 & 2	..	e l g
Montreal	Canadian Light & Power Co.	44	60	00 c	27	2	11,000	..
"	Montreal Lt. H. & Pr. Cons.	25	63	00 c	34	2	..	..
"	" " " " " "	12	63	0 c	12	4	..	..
"	" " " " " "	66	63	00 c	30	1	..	..
"	" " " " " "	66	60	..	30	..	..	..
"	" " " " " "	110	..	a	48†	2	..	e g
Papineauville	Papineauville El. Co	10	60	..	11	.	..	..

* 10 mi. in N.B., additional 165 mi. in Me.

† Portion of this line in Ontario.

Quebec	Laurentian Power Co. Ltd...	50	64	0 c	24	2	6,875	e g
"	Quebec Ry. Lt. Ht. & Pr. Co.	24	63	0 c	14	1	..	l g
Quebec	Quebec Ry. Lt. Ht. & Pr. Co.	24	63	4 c	15	1	..	e
"	" " " " " " "	24	63	4 c	20	2	..	l e
"	" " " " " " "	10	63	4 c	9	3	..	m
St. Johns	Southern Can. Power Co....	25	62	4 c	12	1	..	h
St. Joseph	Beauce El. Co.	15	60	4 c	45	1	2,867	..
Ste. Thérèse	Laval El. Co.	20	30	2 c	48	1	..	r
Shawinigan Falls	Shawinigan W. & Power Co..	50	30 & 60	a	550	1	1,500	..
" "	" " " " "	100	60	a	94	2	3,500	
Sherbrooke	Municipality	13.2	60	0 c	7.5	2	7,500	e g
"	"	45	60	4 c	30	1	5,467	e
"	Southern Can. Power Co..	48	60	⅜ in. s	6	1	2,334	e
"	" " " "	23	60	4 c & a	38	..	..	h
Three Rivers	North Shore Power Co..	10	60	6 & 4 c	27	2	2,105	e h g
Yamachiche	Cie. d'Ecl. de Yamachiche..	13.2	..	..	42	..	..	g m
								..
ONTARIO								
Hydro-Electric Pr. Com. Systems:								
Niagara System	Hydro-Elec. Power Com....	110	25	a & c	110	1	..	
" "	" " " "	6.6–26.4	25	a & c	325	2	14,000	e g
" "	" " " "	46	25	a & c	548	1	2,200	
Severn System	" " " "	22	60	0000 to 2 a	217	2	3,000	e g
Wasdell System	" " " "	22	60	0 a & ¼ & ⅝ in. s	17	..	..	e g
Eugenia System	" " " "	22	60	..	103	1 & 2	3,451	e r g
Muskoka System	" " " "	22	60	2 a	46	1	2,487	e l
Central Ontario System	" " " "	44 11 6.6	60	0000 a & 0 c	176	1 & 2	2,325	e l g
St. Lawrence System	" " " "	26.4	60	000 a	26	1	2,025	e l g
Nipissing System	" " " "	22	60	0 a	347	1	..	e g
Arnprior	Galetta El. Pr. & M. Co.	10	60	4 c	60	1	2,458	e g
Aurora	T. & Y. Radial Ry.	12	25	00 c	24	1	..	e h g
Cobalt	N. Ont. Lt. & Power Co....	11	60	4 to 0000 a & c	6	1	..	m g
"	" " " " " "	44	60	0 a & 2 c	38	1	..	e
Cornwall	St. Lawrence Power Co....	11	60	6 c	25	2	..	e g
Copper Cliff	Can. Copper Co.	43	25	1 c	90	1	..	e g
					12	1 & 2	..	e h r
					37	2	..	e

TABULATED SUMMARY OF TRANSMISSION LINES—*continued*

Described under	Organization	Voltage, kilo-volts	Cycles	Gauge number and material of conductors	Total mileage	No. of circuits	Value per mile, dollars	Lightning protection
Englehart	Nor. Ont. Light & Power Co.	11	60	6 c	8	1	..	h r
"	" " " " " "	33	60	6 c	29	1	..	h r
Fort William	Kaministikwa Power Co	25	60	00 c	18.5 23.5	1 2	..	e g e g
Hamilton	Dom. Power & Trans. Co.	44	66	..	187	..	..	e g
Hawkesbury	Hawkesbury Electric Co.	10	60	4 c	17.5	2	..	g m
"	" " "	17.5	60	00 a	10.5	1	..	e
Helen Mine	Algoma Steel Corporation	22	60	00 & 1 a	18	1	..	e h g
Kemptville	Kemptville Milling Co.	10	60	..	14	..	..	..
Kingston Mills	Gananoque El. Lt. & W. S. Co	13.2	60	a	20	1	..	e
Michipicoten	Algoma Power Co.	10	25	1 & 4 c	10	1	..	e m
Niagara Falls	Toronto Power Co.	60	25	198,000 C.M. c	160	2	..	e
Orillia	Municipality	23	60	..	40	1	..	e
Pembroke	Pembroke Electric Light Co	25	60	4 c	14	1	1,429	e
Sandwich	H.E. Pr. Com. (Essex Co Light & Power Co.)	23	60	0 a	..	..	..	e
Sudbury	Waenapitei Power Co.	22.5	60	..	26	..	..	..
Timmins	Nor. Ont. Light & Power Co.	12	25	..	40	..	..	e
MANITOBA								
Brandon	Can. Gas & Elec. Corporation	11	60	6 c	10.5	1	..	m
Winnipeg	Winnipeg Municipal	66	60	278,600 C.M. a	78	2	..	e
"	Winnipeg Elec. Ry. Co.	60	60	00 c	60	2	..	e
ALBERTA								
Bankhead	Can. Pac. Ry. Co.	13.2	60	..	6	..	..	..
Calgary	Calgary Power Co.	55	60	0 a	100	1	..	e g
"	" " "	12	60	00 a	8	3	..	e g
BRITISH COLUMBIA								
Copper Mountain	B.C. Copper Corporation	38	60	..	13	..	..	m
Cumberland	Canadian Collieries, Ltd.	13.2	..	00 a	26	..	..	..
Kamloops	Municipality	44	60	..	42	..	1,667	g
Nelson	Municipality	12	60	a	11	2	..	..

Rossland	W. Kootenay Pr. & Lt. Co	60	60	92,000 C.M. c	170	1	4,000‡	e
"	" " " " " "	20	60	2 c	32	2	2,000‡	e
"	" " " " " "	20	60	8 c	26	2	1,000‡	e
"		22	60	3 c	27	2	..	m
Vancouver	B.C. Electric Ry. Co.	34 6	60	..	147	2	..	..
"	" " " "	11	60	..	48	..	..	..
"	Western Power Co. of Canada	60	60	00	90	2 & 1	..	e
Victoria	B.C. Electric Ry. Co.	60	60	00 a	83	1	1,600-5,600	e
"	" " " "	11	60	..	27	..	1,730-2,400	e
YUKON								
Dawson	Can. Klondyke Power Co.	33	60	00 c	39	1	.	e

‡ Including right of way.

TABLE III.

Electric Plants in Canada—Distribution

Abbreviations :

Ownership—p=private; m=municipal or public.
Rates—n=minimum charge; r=meter rental; a=3c. per 100 sq. ft. area per month.

NOTE.—The rates given in this table have been worked out to approximately comparative values; for actual rates in force see under each place in text.

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates						Street lighting	
						Ordinary lighting			Power				
						Meter rate		Flat rate, yearly, per 16-c.p. or 40-w.	Meter rate		Flat rate, net, per h.p.-year	Kind	Charges per year per lamp
						Net per k.w.h.	Fixed charges		Net per k.w.h.	Fixed charge per h.p.-year			
NOVA SCOTIA						cents		dollars	cents	dollars	dollars		dollars
Amherst‡	10,500	p	950	35	1,240	9·9–11·7	..	6·60–10·20	2–2½	12–40	40–85	25w.–40w.	13·75–17·75
Annapolis Royal	1,019	m	70	3½	130	..	..	1·92–3·60	..	..	..	40w.–60w.	..
Antigonish	1,787	p	50	3	225	14·4–16·2	..	3·60–7·20	..	..	..	40w.	14.30
Bear River	..	p	50	6	..	..	..	2·20–6·00	..	..	..	..	..
Bridgetown	996	p	65	5¾	160	..	..	3·65–10·95	..	..	..	40w.	18.00
Bridgewater	2,775	m	132	20	400	..	..	1·00–5·00	..	..	..	32 c.p. and 60w.	..
Canso	2,000	m	45	7	170	14·4–16·2	..	..	..	..	..	40w.	7
Dartmouth	7,500	p	300	13	730	9–9·6	..	..	3·6–6	..	..	..	..
"	..	m	10	12	1	..	..	..	..	..	..	40w.–60w.	..
Digby	1,247	p	39	5	175	16–17·5	..	..	..	..	..	40w.	14.50
Dominion	2,589	m	..	4	200	10	..	..	..	..	..	60w.	..
Glace Bay	17,000	m	254	20	1,100	10	r	3·00–3·96	..	..	..	60w.–100w.	12·00–14·00
Halifax	46,619	p	3,200	52	5,360	6½–9	..	..	3·6–6	..	..	Luminous and a.c. arc	95.00 62.50
Hantsport	686	p	34	5	72	15	n r	..	..	..	..	40w.	..
Inverness	2,719	p	38	1	..	..	..	7·68–8·64	..	..	..	50w.	10.80
Kentville	2,500	p	75	4½	225	10–14	r	5·00–7·50	..	..	..	60w.	18.00
Lawrencetown	..	m	9	3	95	..	..	0·90–2·40	..	..	..	40w.	..
Liverpool	2,109	m	225	5	..	..	..	1·50–5·00	..	..	15–20	75w.–40w. and arc	..

‡System includes other places.

Lunenburg	2,683	p		13	400	10	r	2.00–5.00				40w.	12.00
Mahone	..	m	20	4½	115	10	..	3.00–5.00				40w.	8.00
Middleton	900	m	50	11½	111	15	..	..		..		40w.	12.00
Oxford	1,392	p	112	10	130	12	..	0.96–6.00				60w.	8.00
Parrsboro	2,856	m	45	3	180	10	r	..				40w.	..
Pictou	3,179	m	176	13½	425	10	n r	..	3–8	n		enc. arc	40.00
Shelburne	1,435	m	150	6½	120	..	..	2.00				400w.–100w.	40.00 & 17.00
Springhill	5,713	p	190	7	614	10–12		4.80			18.00	40w.	..
Stellarton‡	3,910	p	800	26	1,800	10–12·5	..	..	7·5–9			40w.–100w.	11.00
Stewiacke‡	633	p	40	15	100		..	2.01–9.00				60w.	11.00
Sydney Mines‡	8,780	p	150	10	900	11	n r	3.60–4.80	4–10			450w.	55.00
Sydney‡	17,723	p	1,800	55	2,397	9–11·4	..	6.00–8.00	3–9	r		60w.	12.00
Truro	7,500	m	335	25	794	9–13·5	n	..	4·95–10·8	n		40 c.p.	19.00
Waterford	..	p	115	4	250	10	..	..	..	..		40 c.p.	19.09
Windsor	3,452	p	105	30	328	12½–22½	..	8.75–12.00	..	..	..	200 c.p.	62.62
Wolfville	1,458	p	55	5	255	12½	..	..	..	..	..	60 c.p.	8.50
												32 c.p.	19.20
Yarmouth‡	7,000	p	275	40	560	13·5	..	..	2·7–9	..	..	60w.	21.00
												40w.	11¼c. per k.w.h.
PRINCE EDWARD ISLAND												250 c.p.	..
Alberton	800	p	..	5	85	15	..	3.60	..	..	..	60w.	..
Charlottetown	11,203	p	500	7	1,545	13	..	..	7	..	..	40w.	21.00
Crapaud	..	p	..	3	35	15	..	..	..	..	..	a.c. arc	73.00
Kensington	800	p	22	6	80	15	..	..	..	..	..	40w.	23.00
Montague‡	..	p	52	12	200	10–15	..	4.50	..	..	..	..	..
North Tryon	..	p	11	5	20	15	..	..	..	..	..	60w.	22.50
Summerside	2,678	p	75	7	354	15	..	..	..	..	..	25w. & 40w.	10 00 & 14 00
												..	..
NEW BRUNSWICK												80w.	22.50
Andover‡	..	m	49	15	150	10	..	..	4	..	..	60w.	2.50
Aroostook	..	p	..	4	47	10	..	..	3–6	n	..	..	..
Bathurst	960	p	80	15	350	12	n r	..	3	..	..	100w.	15.00
Campbellton	4,500	m	200	10	750	9–10	r	..	5–10	n r	..	Mag. arc	25.00
Centreville	..	p	20	4½	..	..	..	1.83	..	..	..	40w.&60w.	7.00
												40w.	3.65

‡ System includes other places.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
New Brunswick—*con.*						cents		dollars	cents	dollars	dollars		dollars
Chatham	4,666	m	150	21	480	14¼	..	..	5½–10	..	..	40.–80 c.p.	
Chipman	..	p	..	½	25	..	..	5.40	10–12	..	..	16 c.p.	..
Dalhousie	1,650	m	20	6	123	10	..	..	..	..	..	80 c.p.	..
Dorchester	1,080	p	33	4½	100	15	n		..	..	..	40w.	15.00
Edmundston	2,650	m	305	5	250	6½–9·6	..		2·7–5·4	..	..	75w.	15.00
Fredericton‡	7,208	p	350	25	952	12	..		5–8·1	..	..		..
"	..	m	50	13	1	..	..	..	..	..	..	enc. arc & 60 c.p. to 400 c.p.	..
Grand Falls	1,280	m	97	8	125	9	..	..	3–10	..	..	60 c.p.	..
Marysville	1,837	p	10	4	130	10	..		..	..	..	100w.	16.20
Moncton	15,384	p	880	50	1,585	10·4	..	..	3.8–10.4	..	..	60 c.p.	15.00
Newcastle	2,945	m	150	12	375	12	..		..	..	..	series arc	65.00
Port Elgin	..	p	..	5	55	15	n r		..	..	..	80w. & 32 c.p.	..
Richibucto‡	871	m	112	16	100	12	r		3	..	30.00	16 c.p.	16.00
Sackville	2,300	p	187	10	..	15			3–10	..	..	100w.	12.00
Shediac	1,442	p	50	4	90	13½	..		..	..	..	40w.	18.75
St. Leonard	..	p	..	..	50	8	..		8	..	..	60w.	12.75
St. John‡	42,511	p	3,000	75	7,092	5·4–10·8	n		1·8–9	n		enc. arc	75.00
St. Stephen‡	3,273	p	225	10	330	7–10	n		1·6	12		Magnetite	60.00
Sussex	2,000	p	90	10	325	12·6–13·9	..		..	..	..	40–w.	22.00
Woodstock	3,856	p	375	20	600	10	..		2–3	..	..	80 c.p.	18.25
												100w.	13.33
QUEBEC													
Actonvale	1,402	p	37	5½	126	10	r	2.00–4.00	..	..	..	60w.	9.00
Amqui‡	1,216	p	70	..	500	12.8	..	3.65			25.00 up	..	..
Asbestos	2,224	p	..	2	25	..	..	..			..	32 c.p.	..

‡System includes other places.

Ayers Cliff‡	316	p	..	17	151	7 5	n	..	·162–4·5	5–64	14.17–87.75	16 c.p.	4.00
												40w. & 60w.	5 00–8.00
Baie-St. Paul	1,857	p	150	3¾	350	..	..	2.50–5 00	..	..	..	40w.	..
Beauceville	1,677	p	..	2	206	11¼	nr	4.20–6.00	1–2	18	30.00	40w.	5 00
Beauharnois	2,105	p	600	20	600	9–12	..	..	..	..	30.00–50.00	100 c.p.	..
Beauport	..	p	..	1	3	7	n	..	0·8–3	12	30.00–60.00	..	..
Bedford	1,432	p	43	2½	90	15.	..	6.00	..	..	..	25w.	8 00
Beebe	808	p	..	8	144	7·5	n	..	·162–4·5	5–64	14.17–87.75	60w. & 16c.p.	15.00 & 5.00
Beloeil	1,501	m	30	6	198	12	..	..	6	..	..	100 c.p.	10.30
Berthierville	1,335	p	225	2	225	4–12	n	2.88	3	12	..	{100w. {150 w.	14 00
Black Lake	2,645	p	1,500	10	6	..	..	..	..	..	30.00	..	..
Bromptonville	1,239	p	..	5	161	7·5	n	..	·162–4·5	5–64	14.17–87.75	25w.	8.00
Buckingham‡	3,854	p	200	12	750	..	..	3.00	..	..	..	{series arc {400 c.p.	55.00
Campbells Bay	447	p	15	3½	37	15	..	..	..	..	..	100w.	12.00
Capelton	..	p	150	½	17	7.5	n	..	·162–4·5	5–64	14.17–87.75	..	..
Chambly‡	900	p	..	11	305	7	n r	3.20–5.50	..	..	..	32 c.p.	13 00
Chandler	1,151	p	..	5	180	12	..	..	..	..	..	100w.	..
Chicoutimi ‡	5,880	p	1,500	6	1,500	..	..	1.80–5.40	..	..	20.00–40.00	100w.	8 00
Coaticook	3,165	m	450	15	475	6	..	..	..	..	15.00–25 00	60 c.p.	15 00
Como‡	900	p	..	3½	82	11.2–13·5	..	..	..	..	..	150 c.p.	18 50
Cowansville ‡	881	p	30	5	150	7·5	n	..	·162–4·5	5–64	14.17–87.75	100w.	12 00
Danville	1,331	p	25	5	200	10	..	..	..	..	..	60w.	10.00
Deschambault ‡	..	p	..	14	..	8	..	..	..	..	25.00–40.00	60w.	8 00
Disraeli	1,606	p	32	4	150	..	..	2.00–5.00	..	..	..	40w.	2 50
" ‡	..	p	..	7	200	11	..	..	·93–1·2	b	..	40w.	6 00
Dixville	404	p	8	1½	22	..	..	1.00–2.00	..	..	..	40 w.	5 00
Dorval	1,005	m	102	7	175	10	..	..	..	..	..	80 c.p.	..
Drummondville‡	1,725	p	200	3	517	7·5	..	..	·162–4·5	5–64	14.17–87.75	100w.	12.00
East Angus‡	2,599	p	188	17	700	8–10	..	..	2 up	..	..	60w.	6.00
East Broughton	1,000	p	23	1	50	..	..	5.40	..	..	..	..	..
" "	..	p	..	3	3	..	..	..	..	..	30.00	..	..
Eustis	..	p	500	1½	53	7·5	n	..	·162–4·5	5–64	14.17–87.75	..	..
Farm Point‡	..	p	150	16	100	..	..	3.60	..	..	..	50w.	15 00
Farnham	3,560	m	200	12	600	10	..	..	5	..	20.00	{80 c.p. {250 c.p.	10 00
Foster‡	220	p	120	12	370	7·5	n	..	·162–4·5	5–64	14.17–87.75	100w.	9 00
Frelighsburg	282	p	14	¾	33	..	..	3.00–6.00	..	..	..	40w.	7 00
Gaspe	606	p	..	1½	14	31	..	..	..	..	..	25w.–100w.	..
Granby	6,000	p	120	5	600	7·5	n	..	·162–4·5	5–64	14.17–87.75	500w.	..

‡ System includes other places.

b=Fixed charge varies with amount taken.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Ordinary lighting: Meter rate: Fixed charges	Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Power: Meter rate: Net per k.w.h.	Power: Meter rate: Fixed charge per h.p.-year	Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Quebec—*continued*						cents		dollars	cents	dollars	dollars		dollars
Grande-Baie‡	1,355	p	200	3	1,200	..	..	1.80–5.40	..	..	20.00–40.00	100w.	10 00
Grand'mère ‡	8,200	m	150	8	2,000	5	r	1.80 & 1.44	..	..	18.00–22.00	150w.	13 20
"	..	p	23	2	90	..	..	2.88	5–6	..	..	32 c.p.	..
Grenville	1,383	p	100	2½	76	8	..	3.60	..	..	15.00–24.00	100w.	12 00
Hébertville‡	655	p	40	12	225	..	..	1.75–6.00	..	..	..	100w.	5 00
Hemmingford	313	p	..	2	55	10	..	2.00	..	..	..	60w.	12 00
Howick	410	p	53	12	100	9	r	..	..	..	..	60w.	8 00
Hull ‡	22,190	p	..	28	2,141	·99–1·98	a						
Hull (*a*)	..	m	..	..	..	..	..				..	100–600 c.p.	..
Huntingdon	1,265	p	75	5	200	9	..	2.40	..	..	..	100w.	10.00
Joliette	8,625	m	..	15	950	1·6–8	..	..	..	..	..	{arc & 100w–150w.–250w.	..
Jonquière	4,000	m	275	6	850	8	..	0.96–4.80	..	..	20.00–38.00	60–250 c.p.	4.20 per 50w.
Lachine	15,500	m	798	22	2,200	7	..	..	2½–3	..	..	80–250 c.p.	35 per h.p.-yr.
Lachute‡	2,407	p	225	19	500	10	..	3.65	..	..	..	60w.	12.50
Lake Edward	..	p	20	2½	25	..	..	6.00	..	..	..	..	..
Laprairie	2,388	m	35	5½	160	9	r	..	3·6	{15.00 & r}	..	80w.	
La-Tuque	4,000	p	2,250	12	641	5	..	2.40	..	..	..	Arc & Tungs.	
Laurentides‡	1,128	p	90	25	588	10			5			15c.p.–100w.	3 75 & 5 00
Lennoxville ‡	1,211	p	..	10	336	7·5			·162–4·5	5–61	14 17–87 75	60w.	10 00 & 9.00
Lévis	7,452	p	..	45	2,100	7	n	..	0·8–3	12.00	30.00–60.00	40–80w.	6 50–10.00
Longueuil (*b*)	4,703	p	38	8	..	..	..	..	..	..	..	60–80 c.p.	..
Loretteville	1,565	p	..	3¼	287	7	n	..	0·8–3	12.00	30.00–60.00	..	..
Louiseville ‡	1,675	p	100	9	500	10	n	..	3	..	30.00–45.00	40w.	12.00
Magog	4,530	m	1,100	15	400	..	..	2.76–3.36	..	..	20.00	60 & 100w.	..
Maniwaki	1,461	p	199	10	125	..	..	2.50	..	..	25.00–35.00	..	..
Marieville	1,787	m	137	5	200	5–10	n r	..	..	..	20.00–38.00	100 & 60w.	12 00 & 10.00
Megantic	2,754	p	30	6	250	10·8	r	6.00	..	..	..	40w.	11.00
Mont Joli	2,141	p	40	8	127	10	..	5.84	..	..	..	40w.	..
Mont Laurier	1,643	p	75	5	150	10	n r	2.50–6.00	..	..	20.00–40.00	60w.	6 00

Montmagny	3,889	p	94	7½	500	10			..			60w.	10.00
Montmorency	3,580	p	..	26	480	7	n		0·8–3	12.00	30.00–60.00	16 c.p.–100w.	..
												4 amp. mag.	75.00
Montreal ‡	685,000	p	19,500	64	13,000	5			2·5	5	30.00–60.00	6·6 amp. arc	90.00
												40–100w.	10.00–35.00
												Mag. 6·6 &	
Montreal ‡	..	p	99,500	610	100,000	2–5	r		1·2	12.15 r	16.00–45.00	4 amp.	72.70 & 63.15
												80 & 40 c.p.	23.00 & 16.00
Murray Bay	1,685	p	375	..	..	..		3.00				32 c.p.	9.00
New Glasgow	131	p	5	½	14			3.60				40w.	..
Nicolet	2,593	p	75	2½	170	3·4–10·2			1½–3	12	..	100w.	12.00
North Hatley	450	p	..	5	125	7·5	n		·162–4·5	5–64	14.17–87.75	60w.	5.00
Ormstown	782	p	50	2	100	10		3.00			..	60w.	10.00
Outremont *b*	12,300	m	..	26	..						..	250 & 400 c.p.	35.11, average
Papineauville ‡	1,015	p	150	8	275			3.12–4.16			25.00	100w	10.00
Philipsburg	347	p	..	1	30							100w.	20.00
Pierreville	1,363	p	30	1	90	4–12	n	2.88	½–3	12		60w.	12.00
Plessisville ‡	1,559	p	188	20	225	9–13·5			1½–2			40w.	9.54
Pointe Claire ‡	2,700	m	120	9	365	9	..		2	..	..	100 c.p.	..
Pointe Gatineau	1,906	m	..	3	300	..	..	4.20				25–40w.	..
Pont Rouge	..	p	30	1½	150	10	..	3.19			..	40w.	8.00
Portneuf ‡	879	p	675	13	75	3·6–9					..	..	..
Quebec—P.S.C.	110,000	p	2,000	75	6,000	6·5–7	..	..	·68·3	..	..	Lum. arc	46.51
												60 & 80 c.p.	8.70
Quebec—Q.R.L.P. ‡	..	p	7,300	84	9,853	7	n		0·8–3	12.00	30.00–60.00	..	..
Richmond ‡	2,175	p	135	5½	460	7·5	n		·162–·45	5–64	14.17–87.75	60w.	15.00
Rimouski ‡	3,097	p	150	13	521	12·7	r	5.84			25.00–40.00	32 c.p.	10.00
Rivière-du-Loup ‡	7,023	m	206	16	760	10	r n					enc. arc	91.25
												100–250w.	10.95
Robertson	603	p	22	1¾	89	..	..	4.25				..	..
Roberval	1,948	m	96	9	234	9·6–12	r n	2.00–4.80				100w.	9.00
												enc. arc.	50.00
Rock Island	1,159	p	300	4½	241	7·5	n		·162–4·5	5–64	14.17–87.75	60 & 40w.	15.00 & 12.00
												16 c.p.	5.00
Roxton Falls	873	p	45	5	95	12	r n	3.00–5.40			..	60w.	10.00
Ste. Agathe	2,600	m	150	18	364	7·1	r	..	..	..	20.00	60 & 100w.	..
St. Andrews ‡	..	p	150	10	320	10	..	5.84	4–6	..	..	25–250w.	5.00–10.00 per 40w.
Ste. Anne-de-Beaupré	2,145	p	..	1	60	7	n	..	0·8–3	12.00	30.00–60.00	40w.	12.00
Ste. Anne-de-Bellevue	1,971	m	75	5	270	10	..	..	..	..	..	60w.	..
St. Anselme	..	p	25	10	158	..		2.20–3.60					

‡ System includes other places. *a* Street and municipal lighting. *b* Street lighting system.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 16-c.p. or 0 w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Quebec—*continued*						cents		dollars	cents	dollars	dollars		dollars
St. Casimir‡	1,706	p	900	30	228	3·6–9	..	..	..	..	..	60w.	12.50
St. Césaire‡	935	p	113	6	210	..	..	1.20–3.00	..	..	20.00	60w.	..
St. Chrysostôme	533	p	1	½	9	..	..	3.00	..	..	..	..	..
St. Côme	..	p	15	1	72	..	..	4.80	..	..	..	60w.	4.80
St. Felicien	581	p	70	6	110	..	..	11.20	15	..	35.00	..	..
St. Gab.-de-Brandon	1,602	m	225	5	150	9	n r	..	..	..	..	100w.	..
Ste. Geneviève-de-Pierrefonds	400	p	..	10	70	10	..	..	..	..	..	60 c.p.	20.00
St. George, Beauce	1,410	p	75	15	200	..	..	4.00	..	..	..	..	..
" " "	..	p	..	2	100	11¼	n r	4.20–6.00	1–2	18	30.00	..	..
St. Hilaire	558	m	11	4	78	10	..	..	..	..	..	80w.	..
St. Hubert	..	p	..	..	41	..	..	..	..	..	..	..	..
St. Hugues	470	p	25	1½	40	10	n	..	..	..	..	60w.	12.00
St. Hyacinthe‡	11,215	p	900	17	1,200	7·5	n	..	·162–4·5	5–64	14.17–87.75	60 & 100w.	12.00 & 18.00
" " (*a*)	..	m	37	..	..	..	..	..	..	..	..	Mag. arc	..
St. Jérôme	4,734	m	250	15	730	1–6	n r	..	4·5–12·6	n.r.	31.50–45.00	60–400 c.p.	15.00–40 00
St. Johns‡	7,987	p	850	25	1,050	7·5	n	..	·162–4.5	5–64	14.17–87.75	60–80w.	12.00–15.00
St. Joseph	1,440	p	113	1 ½	165	11¼	n r	4.20–6.00	1–2	18	30.00	40w.	5.00
St. Jovite	664	p	35	2	80	..	..	6.00	..	..	..	..	..
St. Lambert	4,031	m	156	11·2	660	5	..	..	..	..	30.00	40w. 250w.	14.00 38.50 per h.p.-yr.
Ste. Madeleine	390	p	30	1	22	7·5	n	..	·162–4·5	5–64	14.17–87.75	..	..
Ste. Marie	1,415	p	..	2	114	11¼	n r	4.20–-6.00	1–2	18	30.00	40w.	9.50
St. Mathias	699	p	..	2	30	7·5	n	..	·162–4·5	5–64	14.17–87.75	..	..
St. Narcisse‡	..	p	190	27	400	3.6–9	..	..	..	..	..	60w.–16 c.p.	10.00 per 60w.
St. Pie	768	p	23	4	66	13	n	2.40–5.04	..	..	..	40w.	10.00
St. Raymond	1,687	m	75	4	250	10	..	2.40–4.80	..	..	..	60w.	..
St. Remi	1,021	p	30	2½	142	..	..	..	..	..	..	50w.	15.00
St. Roch-de-l'Achigan	1,775	p	22	11	117	..	..	4.80	..	..	..	..	..

St. Scholastique‡	656	p	40	10	300	..	..	3.60			..	60w.	5.40
Ste. Thérèse‡	2,600	p	450	50	1,300	10–3	..	..			24.00–40.00	60w.–16 c.p.	12.50 & 10.00
Ste. Tite‡	1,782	p	26	6	300	10	..	..	..			40w.	6.00
St. Ulric	1,655	p	23	1	40	6	n r	5.84	..			25w.	..
St. Vincent-de-Paul	1,492	m	50	1	30	7½	..	2.94	..			15w.	..
Sawyerville	432	p	15	2	75	10	..	..	..			40 & 60w.	5.00 per 50w.
Scotstown	933	p	68	3	100	..	..	3.65	..			60w.	7.30
Shawinigan Falls‡	8,000	p	575*	11	3,000	5	n	1.41	0.4–1¾	9-12	..	100w.	8.40
Shawville	715	m	9	1½	90	25	..	..	..	..	..	100w.	..
Sherbrooke	23,210	m	3,000	32	4,400	5·4	n	..	0.75	n	..	100 c.p. & 750w.	..
" "	..	p	2,300	5	..	7.5	n	..	162–4·5	5–61	14.17–87.75	..	..
Sorel‡	9,229	p	1,350	50	..	6–8	..	..	..	..	40.00	750w.	45.00
Stanbridge East	172	p	..	1½	20	..	..	4.80	..	..	..	40w.	5.00
Stanstead	837	p	41	2½	101	7·5	n	..	·162–4·5	5–64	14.17–87.75	enc. arc 16 c.p.	50.00– 5.00
Sutton	986	m	..	6	150	8	n	..	..	..	..	40w.	12.00
Terrebonne	1,990	m	..	3½	300	5–8	..	..	2½–4	..	..	40w.	..
Thetford	7,261	p	562	9	1,000	7	..	4.00	..	..	30.00–50.00	100w.	12.00
"	..	p	..	20	20	..	See	also Disraeli	..	..	30	..	..
Three Rivers‡	19,000	p	1,100	51	3,270	3·6–7·2	n	..	1–1½	5–12		Mag. & encl. arc 60 to 600 c.p.	50.00 20.00 to 50.00
Tring Junction	308	p	..	½	16	11¼	n r	4.20–6.00	1–2	18	30.00	..	..
Valleyfield	9,449	p	101	5	548	5	..	..	..	..	20.00–25.00	..	..
" (*b*)	..	m	75	..	..	..	..	..	..	..	..	a.c. arc 100–250 c.p.	38.00 15 00 average
Valley Junction	..	p	..	1	78	11¼	n r	4.20–6.00	1–2	18	30.00	..	..
Vaudreuil	495	p	..	2½	60	12	..	..	See also Montreal		..	60w.	15.00
Verdun	23,000	m	658	30	4,200	5	..	2.40–4.80	See also Montreal		20.00–25.00	Mag. arc	65.00
Victoriaville‡	3,028	p	200	18	726	7·2–10·4	..	2.88–3.46	1·8–3·6	..	29.25–39.60	60w. & 100w.	8.00 & 12.33
Waterville‡	1,054	p	..	3	120	7.5	n	..	·162–4·5	5–64	14.17–87.75	40 & 60w.	5.00
Weedon	836	p	413	3	90	11¼	n r	4.20–6.00	1–2	18	30.00	16 c.p.	4.00
Westmount	18,260	m	..	21	3,100	5	See	also Montreal	..	..	20.00–50.00	Mag. arc 6.6 & 4 amp.	.. 100.00 & 60.00
West Shefford	363	p	10	2½	50	15	..	5.00	..	..	..	60w.	6.00
Windsor Mills	2,144	m	22	6¼	250	6	..	..	2	..	..	60w.	..
Yamachiche‡	965	p	56	5	300	8	..	..	..	..	..	..	..

* Exclusive of power supplied directly by Shawinigan W. & P. Co.

‡ System includes other places. *a* Street and municipal lighting. *b* Street lighting system.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
ONTARIO						cents		dollars	cents	dollars	dollars		dollars
Acton	1,570	m	..	6	275	1·57–3·15	a	..	·135–3·24	12	..	80 & 100 c.p.	..
Ailsa Craig	462	m	56	3	63	2·92–5·85	a	..	·135–5·49	12	..	100w.	15.50
Alexandria	2,434	m	73	5	225	10	..	..	..	..	..	100 & 60w.	12.00 & 9.00
Alliston	1,237	p	53	6	240	12	..	..	..	..	..	75w.	17.00
Almonte	2,631	m	75	7	..	1·35–3·6	a	..	..	..	..	150 & 400 c.p.	11.00 & 21.00
Alton	..	p	75	See Orangeville		..	..	..	..	..	..	..	..
Alvinston	706	p	..	3½	111	..	..	2.40	..	..	..	100 & 60w.	..
Arkona	424	p	..	2½	65	10	..	..	6	..	..	..	..
Arnprior	4,013	p	450	7½	356	9–10·8	..	4.59–6.63	..	..	25.00	50 & 100 c.p.	9.00 & 18.00
Arthur	1,003	m	94	3	120	3–6	..	..	..	..	..	200w.	14.00
Aurora	2,041	m	..	12	443	2–3	n	..	¼–2½	12	..	100w.	8.75
" ‡	..	p	..	30	230	2·7–7·2	n	..	..	..	..	..	..
Aylmer	2,119	m	..	5	429	8½	..	..	..	..	..	arc	75.00
Ayr	780	m	75	4	130	2·25–4·5	a	..	·135–4·05	12	..	100w.	14.00
Baden‡	576	m	150	3	89	1·57–3·15	a	..	·135–2·88	12	..	100w.	11.00
Bancroft	541	p	40	5	..	..	..	3.60	..	..	..	32 c.p.	8.00
Barrie	6,866	m	446	40	1,153	1·35–2·7	a	..	·135–3·24	12	..	100w.	10.00
Beachville	..	m	141	2	57	1·8–3·6	a	..	·135–2·07	12	..	100w.	12.00
Beamsville	1,116	p	..	5	..	5 2	n nh	..	..	..	..	60–100 c.p.	10.00
Beaverton	1,015	m	43	6	210	1·8–3·6	a	..	·27–3·24	12	..	100w.	13.00
Beeton	614	m	25	1	75	11	..	..	..	..	..	32 c.p.	..
Belleville	12,006	m	1,350	40	2,023	1·35–2·7	a	..	·135–1·71	12	..	100 & 1,000 c.p.	10.00 & 56.15
Blenheim	1,443	m	..	8½	300	4 5	a	..	..	..	..	150w.	15.50
Blind River	1,526	p	94	11	140	..	..	3.84	..	..	20.00	80w.	25.00
Blyth	665	m	26	2½	..	10	..	..	..	..	..	60w.	..
Bobcaygeon	1,000	m	64	6½	265	..	..	2.00	..	..	10.00	arc 100 & 80 c.p.	..
Bolton	628	m	75	3·6	110	2·25–4·5	a	..	·135–4·05	12	..	100w.	14.00

Bothwell	735	m	113	11½	148	7½	..		..	..	60.00	100w.	15.50
Bowmanville	3,545	m	935	20	673	1·35–2·7	a	..	·135–1·89	12	..	80 c.p.	11.00
Bracebridge	2,506	m	1,150	10	331	..	..	2.00	..	..	12.50–15.00	100 c.p.	10.00
Brampton	4,024	m	863	20	950	·9–1·8	a		·135–1·89	12		100w.	7.50
Brantford	27,664	m	2,031	90	2,959	·9–1·8	a		·121–1·35	12		{Mag. arc {100w.	40.00 7.50
"	..	p	..	30	See	Hamilton	..	..	..	..	..	..	..
Brechin	..	m	30	2½	37	2·7–5·4	a		·27–4·05	12		100w.	13.00
Breslau	..	m	30	6½	18	6	a		·75–4	12		..	..
Brighton	1,278	m	68	20	353	2·25–4·5	a		·135–3·78	12		80 c.p.	10.00
Brockville	9,547	m	..	17	1,176	10			2–4½	12		{100w. {60w.	14.00 ..
Bruce Mines	742	m	26	4	60	15			..	..	..	100w.	15.00
Brussels	902	m	60	6	100	10			..	..	..	100w.	15.00
Burford	..	m	23	2½	95	2·25–4·5	a	..	·135–3·78	12	..	100w.	13.00
Burgessville	..	m	23	1	40	5½	a	2.40	1·5–4·9	12	..	100w.	..
Burks Falls	1,008	p	70	3	300	8	r	2.88	..	..	..	40 & 60w.	..
Burlington	2,530	p	..	18	See	Hamilton	..	..	..	..	..	..	..
Caledonia	1,201	m	41	3	67	1·35–2·7	a		·135–1·98	12	..	100w.	12.00
Callander	..	m	19	3	101	8	..	..	..	..	..	100w.	20.00
Camden East‡	..	m	221	11½	90	2·02–4·05	a	..	·135–3·15	12	..	100w.	15.00
Campbellford	3,051	m	1,462	20	800	..	..	1.60	..	..	15.00	arc & 100w.	40.00 & 5.00
Cannington	775	m	45	5	225	3·6	a	..	·243–2·91	12		100w.	12.00
Cardinal	1,184	p	75	1½	110	7	..	2.00	..	..	..	16 c.p.	5.00
Cargill	..	p	45	2	55	..	..	..	..	..	..	..	..
Carleton Place	3,706	p	450	13½	..	{6 {3½	r r, g	2.60–5.20	1½–2	10.00	21.00–33.00	40w.	6.00
Casselman	976	p	..	2	40	..	..	1.80–2.40	..	..	..	60w.	15.00
Chapleau	1,733	p	75	5	343	10	..	..	..	..	..	200w. & 100w.	20 per 100w.
Chatham	13,943	m	750	25	1,600	1·57–3·15	a	..	·09–2·59	12		100–500w.	12.00–38.00
"	..	p	450	26	1,700	1¾–7	..	..	1–4	..		..	..
Chatsworth	286	m	15	3	64	2·02–4·05	..	..	·121–2·83	12		150w.	12.00
Chesley	1,860	m	75	8	231	2·25–4·5	a		·135–3·78	12		{100w. {200w.	13.00 ..
Chesterville	868	m	81	4	128	2·25–4·5	a		·243–3·4	12		100w.	13.00
Clinton	1,981	m	90	15	211	2·25–4·5	a	..	·135–4·32	12		60w.	12.50
Cobalt	5,079	p		10	1,500	8	..	..	1–3		50.00	{enc. arc {100 c.p.	55.00 14.50
Cobden	727	m		3	62	·8–4	..	..	..			150w. & 250w.	12.00 & 20.00

‡ System includes other places.
h Plus 50c. and upwards per month, fixed charge.
g Plus 2c. per 100 sq. ft. area per month.

ELECTRIC PLANTS IN CANADA—*continued.*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Ontario—*continued*						cents		dollars	cents	dollars	dollars		dollars
Cobourg	4,879	m	394	30	729	1·8–3·6	a	..	·135–1·89	10.80	..	100 & 500w.	13.00 & 47.50
Colborne	1,012	p	56	10	200	8	..	..	..	..	..	50w.	12.00
Cochrane	1,619	p	..	3	290	10	..	..	3	..	40–50	arc	65.00
Coldwater	617	m	28	4	111	1·8–3·6	a	..	·135–2·88	12		80 c.p.	21.66
Collingwood	7,619	m	1,500	28	1,145	1·12–2·25	a	..	·121–1·62	12		100w.	12.00
Comber	..	m	16	2½	..	3·15–6·3	a	..	·135–6·12	12		100 c.p.	10.00
Copper Cliff‡	3,844	p	..	14½	..	..	..	1.60	..	..		100w.	16.50
Cornwall	6,947	p	..	15	940	7	..	..	..	..		50–200 c.p.	..
" ‡	..	p	..	6	..	9	..	..	..	..		100 c.p.	10.00
Creemore	599	m	56	5	135	3·15–6·3	a	..	·135–5·76	12		60w.	10.00
Delaware	..	m	19	1	35	2·7–5·4	a	..	·135–4·86	12		100w.	16.00
Delhi	664	p	80	5	135	8	r	..	..	..	..	100w.	14.00
Deseronto	2,061	m	266	22	179	1·8–3·6	a	..	·135–1·98	12	25–40	60 & 80 c.p.	15.00
Dorchester	378	m	19	2½	79	2·25–4·5	a	..	·135–4·68	12		100 c.p.	12.00
Drayton‡	613	m	75	2	90	1½–7	a	..	..	..		100w.	14.00
Dresden	1,403	m	54	8	307	2·25–4·5	a	..	·135–3·24	12		40 & 100w.	..
Drumbo	272	m	11	1½	57	2·25–4·5	a	..	·135–4·23	12		100 c.p.	15.00
Dryden	729	m	30	8	130	10	..	3.36	2½	..		100w.	14.00
Dundalk	750	m	150	3	160	1·8–3·6	a	..	·225–2·61	12		60 & 100w.	16.80 per 100w.
Dundas‡	5,016	m	396	20	1,002	·9–1·8	a	..	·121–1·29	12		100w.	12.00
"	..	p	..	8	See	Hamilton	..	..	..	..		100w.	9.00
Dunnville	3,286	m	..	4.33	285	6	..	4.41–2.88	..	..		..	..
Durham	1,520	m	75	5	240	2·02–4·05	a	..	·135–3·42	12		100w.	10.50
Dutton	840	m	34	4½	165	2·25–4·5	a	..	·135–3·78	12		100w.	12.00
Eganville	1,125	p	100	5	150	8–10	..	1.50–3.00	..	..		100w.	15.50
Elk Lake	1,456	p	100	5	100	8	..	..	..	..		100w.	16 00
Elmira	2,065	m	188	5	338	1·57–3·15	a	..	·135–3·51	12		100w.	10.00
Elmvale	..	m	52	3	143	2·02–4·05	a	..	·135–3·24	12		100w.	12.00
Elmwood	..	m	38	1	40	2·02–4·05	a	..	·135–3·51	12		100w.	12.00
													16.50

Elora	1,197	m	120	5	170	1·57–3·15	a	..	·135–31·5	12		100w.	12.50
Embro	472	m	20	4	100	2·47–4·95	a		·135–44·1	12		100w.	14 00
Englehart‡	563	p		5	170	10			1½–3	12		100w.	14.50
Espanola	..	p	..	3	125	..	..	..	..	..		40 & 60w.	..
Etobicoke‡	..	m	..	38	540	2·02–4·05	a	..	·135–2·88	12		100w.	14.00
Exeter	1,504	m	113	10	260	2·47–4·95	a	..	·135–3·78	12	..	100 & 250w.	14.00 & 27.00
Fenelon Falls	930	m	200	15	240		..	1.00–5.00			10.00	{enc. arc	..
												{50 c.p.	10.00
Fenwick	..	p	..	..	..	6	See	Welland	..			100w.	8.00
Fergus	1,679	m	83	11	241	1·8–3·6	a	..	·135–3·15	12		100w.	12.50
Flesherton	428	m	25	2	103	1·57–3·15	a	..	·135–2·34	12		150w.	11.50
Fonthill	610	p	..	..	..	6	See	Welland	..	..		100w.	8 00
Ford	3,136	m	..	..	..	..	See	Walkerville	..	..		100w.	12 60
Forest	1,421	m	75	8	340	3·15–6·3	a	..	·135–6·66	12		{100w.	18 00–20 00
												{ 60w.	13.50
Fort Erie‡	1,146	p	250	18¾	401	1·5–6	n	3.84	{2–3	n		{arc	..
									{⅝–2	{9.00& n		{60w. & 100w.	15 00 per 100w.
Fort Frances	2,788	m	150	11	555	3	n	..	1½–3	n	..	200 & 400w.	35. average
Fort William	18,850	m	1,819	42	5,500	4·5–2·5	n	4.32–8.64	4	..	25.00	{Mag. arc	45.00
" *	..	p	..	23	45	..	..	..	..	..	25 00	{100w.	9.60
Frankford	700	p	..	2¾	..	9	n	..	..	..	..	..	..
Galt	11,920	m	1,875	36	2,701	·9–1·8	a	..	·121–1·48	12	..	75 & 500w.	..
Gananoque	3,593	p	150	20	465	{6½ 2·7	c	..	{3–6½ ·2–2·5	.. 12		60 c.p.	7.20
Georgetown‡	1,654	m	300	9	426	1·35–2·7	a	..	·135–2·88	12		100w.	11 00
Glencoe	847	m	60	4	150	8–10	..		..	..		100 c.p.	10.00
Goderich	4,553	m	225	50	700	2·02–4·05	a	..	·135–4·32	12		100 & 250w.	14.00 & 35.00
Gowganda †	230	p	..	2	1	..	..	..	..	..		..	..
Grand Valley	586	m	75	4	100	3–6	a	..	..	..		100w.	14.00
Grantham Township	..	m	17	26½	158	4·05	d	..	..	..		..	..
Granton	289	m	26	2	57	2·7–5·4	a	..	·135–5·04	12	..	100w.	15.00
Gravenhurst	1,624	m	188	4½	335	2·7	a	..	·120–1·8	12	..	100 & 150w.	8 00
Grimsby	1,786	p	..	12	..	4·5	n	..	..	..	..	60 c.p.	10 00
Guelph	16,308	m	2,625	47½	2,609	·9–1·8	a	..	·108–1·26	12	..	100 & 1,000w.	8.50 per 100w.
Hagersville	1,053	m	75	4	200	1·57–3·15	a	..	·135–3·15	12	..	100w.	12 00

c Plus 3½c. per 100 sq. ft. floor area per month.
* Power service only.
‡ System includes other places.
d Plus 45c. to $2.00 per month, service charge.
† Used for mining.

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Ordinary lighting: Meter rate: Fixed charges	Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Power: Meter rate: Net per k.w.h.	Power: Meter rate: Fixed charge per h.p.-year	Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Ontario—*continued*						cents		dollars	cents	dollars	dollars		dollars
Haileybury	3,410	p	200	7	840	8	..	..	1–3	..	50.00	enc. arc	55.00
												100 c.p.	14.50
Hamilton	104,491	m	11,250	168	15,334	·9–1·8	a	..	·054–·9	8.40	..	500w.	40.00
												250 & 100w.	12.00 & 7.20
"	..	p	..	90	..	..	..	..	..	..	..	..	..
Hanover‡	3,310	m	225	18	400	2·02–4·05	a	..	·135–2·97	12	..	enc. arc	35.00
Harriston	1,563	m	75	10	200	2·47–4·95	a	..	·135–4·32	12	..	100 c.p.	1.50
Hastings	705	p	60	6½	141	.	.	3.00	..	..	..	enc. arc	..
Havelock	1,213	p	100	10	..	..	..	1.50–3.00	..	..	..	300w.	75.00
Hawkesbury	4,742	p	350	8½	466	8	..	3.60	..	..	15.00–24.00	100w.	12.00
Hensall	717	m	90	4	140	6	..	..	..	..	..	100w.	15.00
Hespeler	2,887	m	375	15	375	1·57–3·15	a	..	·135–2·25	12	..	250 c.p.	18.00
												150 c.p.	13.00
Holstein	..	m	11	1	40	2·7–5·4	a	..	·135–4·68	12	..	150w.	15.50
Humberstone‡	1,209	m	100	8½	500	4–7·5	n	..	1–4	..	..	100w.	9.00
Huntsville	2,135	m	638	6½	300	2·25–4·5	a	..	·135–1·8	12	..	100w.	3.30
												400 c.p.	8.40
Ingersoll	5,300	m	675	25	926	1·35–2·7	a	..	·135–1·8	12	..	100 c.p.	11.00
												1,000 c.p.	..
Iroquois	870	m	86	5	175	.	.	1.60–2.64	..	..	..	100 & 150 c.p.	..
Iroquois Falls	1,200	p	.	1½	140	..	..	..	..	..	..	100w.	..
Kemptville‡	1,034	p	175	5	250	8	..	..	..	..	..	60w.	14.00
Kenora‡	5,246	m	2,500	17	1,400	3–10	n	2.80–7.20	1·25–3.5	12.00–15.00	22. up	enc. arc	..
												60 & 100w.	
Kincardine	2,032	m	100	6	285	10	rn	3.00	..	..	..	60–250w.	..
Kingston‡	22,265	m	..	35	2,181	2½–10	..	..	1–3	12	..	Mag. arc	60.00–75.00
Kirkland Lake	..	p	1,125	3	8	..	..	..	1–3	12	..	..	..
Kitchener	19,695	m	3,750	48	2,867	·9–1·8	a	..	·121–1·62	12	..	100–500w.	9.00–33.00
Lakefield	1,033	p	75	6½	150	..	..	3.12–5.20	..	..	..	60–100w.	13.00

Lambeth	316	m	15	1½	68	2·7–5·4	a		·135–4·86	12		100w.	14.00
Lindsay	7,752	m	1,163	35	1,477	1·8–3·6	a		·135–1·89	12		100w. enc. arc mag. arc	12.00 47.50 70.00
Liskeard	1,700	p	125	7	400	8			1–3		50.00	enc. arc 100 c.p.	55.00 14.50
Listowel	2,291	m	150	5½	332	2·25–4·5	a		·135–3·51	12		60 & 350w.	12.50 & 75.00
Little Current	1,137	m	19	4½	126	15	n r					80 c.p. 250 c.p.	23.00
London	57,301	m	7,500	139	9,411	·9–1·8	a		·108–1·35	12		75 & 500	8.00 & 64.25
"		p	350	2		·9–1·8	a		·108–1·35	12			
L'Orignal	1,163	p	17	2	60	10		3.60				60w.	12.00
Lucan	643	m	97	5	147	2·7–5·4	a		·135–4·86			100w.	15.00
Lucknow	922	p	32	3	70	15	r	6.00				enc. arc	50.00
Lynden		m	64	1¾	35	2·02–4·05	a		·135–3·21	12		100w.	12.00
Lyndhurst‡		p		1	90	12		7.68					
Madoc	1,114	m	488	5	210	10		1.60–4.00				60w.	5.00
Markdale	904	m	56	5	183	1·57–3·15	a		·135–2·25	12		150 c.p.	12.00
Markham	1,045	m	22	4	150	10	r					100w.	16.00
Marksville	200	p						6.00				40w.	
Marmora	826	m	75	10	116			3.24 down				60 & 100w.	10.00
Mattawa	1,415	p	75	6½	127	13		3.00–6.00			15.00	enc. arc	42.00
McIrvine	124	m		4	27	5							
Meaford	2,649	p		16	427	6.3			·121–2·83	12		90w. enc. arc	10.70 40.00
Merlin	400	p	12	1¼	68	15						100w.	12.00
Merrickville	837	p	120	7	102	8					18.00	100w.	20.00
Merriton	2,358	m	150	8½	447	3					10.00–19.50	40 & 100w.	5.00
Midland	7,109	m	900	16	1,000	1·12–2·25	a		·09–·99	9.00		100 c.p. 750w.	10.00 30.00
Mildmay		p	20	2½	92	9	n r				32.00	60 & 80w.	12.00
Millbrook	746	m	29	3	165	2·25–4·5	a		·135–3·78	12		60w. enc. arc	12.00 60.00
Milton	2,072	m	225	12	274	1·57–3·15	a		·135–2·25	12		100w.	11.00
Milverton	929	m	150	2	130	2·25–4·5	a		·135–3·51	12		100w.	12.50
Mine Centre		p						1.00–2.50				25w.	1.25
Mitchell	1,656	m	112	7¼	320	1·8–3·6	a		·135–3·51	12		100w.	12.00
Morrisburg	1,415	m	188	10	400			1.00–2.00			7.50	80w.	
Mount Albert		p		2¼	50			3.00				32 c.p.	14.30
Mount Brydges		m	19	2	72	2·7–5·4	a		·135–4·86	12		100w.	14.00
Mt. Forest	1,941	m	83	14	270	2·02–4·05	a		·135–3·42	12		60 c.p.	10.00

‡ System includes other places.

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate, net, per h.p. year	Street lighting: Kind	Street lighting: Charges per year per lamp
Ontario—*continued*						cents		dollars	cents	dollars	dollars		dollars
Napanee	2,881	m	236	32	561	1·35–2·7	a	..	·135–1·89	12	..	{100 c.p.	14.00
												{enc. arc	50.00
Newcastle	611	m	19	3	144	2·02–4·05	a	..	·135–3·15	12	..	60w.	12.00
New Hamburg	1,543	m	150	5	362	1·35–2·7	a	..	·135–2·88	12	..	100w.	9.00
Newmarket	3,340	m	112	8 ½	545	1·5–3	n	..	·2–2	12	..	60 & 100w.	9.25
New Toronto	1,423	m	750	12	226	1·35–2·7	a	..	·135–1·89	12	..	100w.	12.00–15.00
Niagara Falls	11,715	m	1,875	28	2,530	·9–1·8	a	..	·081–·99	12	..	{enc. arc,	50.00
												{100w.	12.00
Niagara-on-the-Lake	1,858	m	128	18	350	2½–5	..	..	..	..	18.00–21.85	32 c.p.	6.00
Nipissing	..	m	2½	2½	13	8	..	..	..	..	..	60 & 100w.	9.00
North Bay	9,197	m	675	30	2,154	1·57–2·7	c	..	·27–2·7	12	..	100w.	20.00
Norwich	1,093	m	195	5	428	1·35–2·7	a	..	·135–2·7	12	..	100 &750 c.p.	12.00 & 50.42
Norwood	659	p	..	3	110	..	..	1.45–6.72	..	..	..	{60 & 100w.	9.00 & 10.50
Oakville	2,749	m	..	20	700	5	..	..	1·15–3	..	..	{400w.	42.00
Oil Springs	537	m	56	3	111	2·25–4·5	a	..	·090–3·78	12	..	40w.	11.10
Omemee	446	m	38	2½	60	2·25–4·5	a	..	·135–4·05	12	..	60 & 1,000 c.p.	Meter basis
Orangeville	2,381	m	150	23	190	2·02–4·05	a	..	·135–3·24	12	..	100w.	..
" ‡	..	p	200	15	450	5–9	..	3.65	2	..	..	250 & 100w.	..
Orillia	7,448	m	3,600	35	1,760	·9–4·5	..	.86–1.08	..	..	13.50–18.00	150–250w.	12.00 & 15.00
Orono	..	m	19	6	128	2·47–4·95	a	..	·135–4·41	12	..	60w.	10.00–12.00
Oshawa‡	8,812	m	1,176	50	1,550	1·35–2·7	a	..	·135–1·89	12	..	100 & 200w.	6.00 & 12.00
Ottawa	101,549	m	4,793	100	10,125	·45–1·8	a	..	·090–1·62	12	..	60w.	12.00
					45							100 c.p.	11.00–12.00
" ‡	..	p	6,500	106	17,800	·45–1·8	a	..	·108–1·17	9.60	20.70–24.30	{100w.	10.00
Otterville	..	m	24	1	70	2·47–4·95	a	..	·135–4·41	12	..	{600 c.p.	45.00
Owen Sound	12,558	m	675	41	1,894	1·80–3·6	a	..	·108–2·80	12	..	400 c.p.	30.00
												100w.	13.00
												{60w.	17.00
												{400 c.p.	11.00
													50.00

Paisley	751	p	49	4½	140	10	..	3.60				60 & 100w.	12.00
Pakenham	..	p	30	3	70	..	..	2.43	..	..	..	50 c.p.	7.30
Palmerston	1,843	m	112	8	260	2·25–4·5	a	..	·135–4·23	12	..	100 c.p.	15.00
Paris	4,447	m	338	16½	650	1·57–3·15	a	..	·135–2·25	12	..	100 c.p.	11.00
Parkhill	1,263	p	32	3	..	∋	..	..	..	..	..	enc. arc	100.00
Parry Sound‡	5,526	m	460	15	900	4	n r	..	1·2–3	n	..	100 & 150 c.p.	2½c per k.w.h.
Pembroke	7,846	p	1,400	25	1,000	2·7	a	..	..	..	18.00	enc. arc	45.00
Penetanguishene	3,672	m	300	14	305	1·35–2·7	a	..	·072–·90	10.80	..	100w.	12.00
Perth	3,358	m	208	15	500	6–8	..	..	1½–3	..	..	enc. arc	65.00
Peterborough	20,598	m	3,375	90	4,956	1·125–2·25	a	..	·081–1·05	12	..	Mag. & 60w.	50.50 & 9.00
Petrolia	3,047	m	180	30	388	2·02–4·05	a	..	·135–3·24	12	..	{150 c.p.	15.50
Picton	3,408	m	161	10	720	10	..	..	6	..	..	{600 c.p.	55.00
Plattsville	398	m	45	1?s	85	2·7–5·4	a	..	·135–4·86	12	..	100 c.p.	6c per k.w.h.
Port Arthur	15,224	m	4,125	35	3,182	·9–1·8	a	..	·135–1·8	12	..	100w.	16.50
Port Carling	256	p	..	..	8	..	..	..	..	..	..	{60w.	..
Port Credit	1,176	m	47	7	180	1·35–2·7	a	..	·135–2·52	12	..	{100w.	7.10
Port Dalhousie	1,318	m	62	10	370	1·8–3·6	a	..	·121–1·86	12	..	60w.	..
Port Elgin	1,321	p	..	7½	236	2·25–4·5	a	..	·135–3·78	12	..	100w.	11.00
Port Hope	4,486	m	401	25	873	1·8–3·6	a	..	·135–1·89	12	..	100w.	10.00
Port Perry	1,004	m	25	15	210	10–12½	..	..	..	..	..	60 & 100w.	14.00
Port McNicoll	571	m	15	5	88	2·02–4·05	a	..	·135–3·24	12	..	100 c.p.	11.00
Port Robinson	..	m	375	1	75	1·35–2·7	a	..	·135–1·62	12	..	25–60 c.p.	4.20
Port Stanley	831	m	150	8	391	1·8–3·6	a	..	·135–4·5	12	..	100w.	12.00
Powassan	572	m	30	6	102	8	..	..	·27–2·88	12	..	..	..
Prescott	2,630	m	180	12	450	1·8–3·6	a	..	·18–2·52	12	..	100w.	6.50–13.00
Preston	4,949	m	1,050	23¼	1,025	1·12–2·25	a	..	·08–1·50	12	..	{60w., 100w.	13., 20.
Princeton	239	m	8	1½	55	3·15–6·3	a	..	·135–7·02	12	..	{150w.	25.
Rainy River	1,502	p	..	4½	240	11	..	..	..	..	..	100w.	6.25
Renfrew	6,611	m	638	21	832	4½–7½	..	..	..	..	..	80 & 150 c.p.	11.00 & 12.00
Richmond Hill	920	m	..	5	165	1·8–4·8	n	..	·5–1·8	6–12	..	100w.	17.00
Ridgetown	2,080	m	64	11	296	2·47–4·95	a	..	·135–4·32	12	..	100w.	15.00
Ridgeville	..	p	..	..	..	6	..	..	..	..	20.00	150 & 750 c.p.	20.00 per h.p.-yr.
Rockland	3,264	p	..	3½	77	..	..	..	..	..	..	100 & 150w.	13.00
Rockwood	..	m	15	3	87	1·8–3·6	a	..	·135–3·51	12	..	100 & 400w.	18.00 & 37.00
												100w.	8.00
												..	..
												60 & 100w.	11.00

c Plus 3½c. per 100 sq. ft. floor area per month.

‡ System includes other places.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Ordinary lighting: Meter rate: Fixed charges	Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Power: Meter rate: Net per k.w.h.	Power: Meter rate: Fixed charge per h.p.-year	Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Ontario—*continued*						cents		dollars	cents	dollars	dollars		dollars
Rodney	626	m	38	5	85	8	..	..	..	..	..	100w.	16.50
St. Catharines	19,078	m	3,525	50	3,155	·9–1·8	a	..	·108–1·08	9.00	..	100w.	7.50
" "		p		25	See	Hamilton	..	..	..	..	..	..	..
St. George		m	38	2¼	82	2·25–4·5	a	..	..	..	..	100w.	15.00
St. Jacob	129	m	56	3	..	..	..	..	..	..	..	..	..
St. Marys	3,960	m	368	62	752	1·35–2·7	a	..	·135–2·79	12	..	100 & 250w.	13.00 & 25.00
St. Thomas	17,216	m	1,575	66	3,112	·9–1·8	a		1·50–·120 and down	12	..	500 & 75w.	37.50 & 9.50
Sandwich‡	3,343	m	505	13	2,025	4·5 3·6–9	e ..	5.19	·9 3·6	27.00 ..	..	See	Windsor
Sarnia‡	12,323	m	1,125	40	2,647	1·8–3·6	a		·135–3·24	12	..	100 & 750w.	15.00 & 50.00
Sault Ste. Marie	12,829	m	800	10	2,500	1·9–4·27	a	..	·19–2	12	..	arc 100–600 c.p.	50.00 12.00–50.00
Seaforth	2,075	m	375	11	425	1·8–3·6	a	..	·135–3·78	12	..	60 & 80 c.p.	12.00 & 15.00
Sellwood	..	p	..		45	8	..	..	..	..	..	..	..
Shelburne	1,018	m	66	4½	184	1·8–3·6	a	..	·135–2·7	12	..	100w.	12.00
Simcoe	4,032	m	100	12½	198	1·8–3·6	a	..	·09–2·16	12	..	300 & 75w.	38.00 & 14.00
Smiths Falls	6,268	m	115 300	7 18	480 700	1·57–3·15	a	..	·135–2·25	12	..	100 & 200w.	19.00 & 24.00
Smithville		m		6½	103	1½–10	..	..	1¼	12	..	100w.	20.00
Southampton	1,639	p		9½	285	2·25–4·5	a	..	·135–3·78	12	..	60 & 100w.	14.00
South Porcupine		p	100	4	300	9	..	..	..	..	..	100w.	21.66
South River‡	494	p	90	12	130	..	..	3.00–3.60	..	..	25.00–48.00	..	..
Springfield	422	m	15	2	57	3·6–7·2	a	..	·135–7·02	12	..	100w.	20.00
Stamford Township		m	338	11	215	3	a	..	·133–1·67	12	..	100w.	8.00
Stayner	990	m	56	10	190	2·02–4·05	a	..	·27–3·78	12	..	60 & 100w.	9.00 & 12.00
Steelton	5,603	m		9½	740	2–10	..	..	1½–2	..	..	100 c.p.	15.00
Stirling	823	m	60	4½	230	3–4	..	1.00–1.73	..	..	10.00–18.00	60w.	8.00
Stouffville	1,020	m	25		185	10	..	..	..	..	..	..	..
Stratford	17,371	m	1,350	49	2,553	1·12–2·25	a	..	·135–2·34	12	..	500w. 100w.	40.00–50.00 10.00

Strathroy	2,816	m	188	6	474	1·8–3·6	a		·135–3·24	12		100 & 250 c.p.	14.00 & 23.00
Streetsville	550	m	281	6	108	6					26.00	100w.	10.00
Sturgeon Falls‡	3,443	p	131	10	400	8			3–4		40.00–60.00	40 & 100w.	10.00 & 20.00
Sudbury	7,042	p		5	19						25.00		
"		m	500	19¼	1,650	7·2–6·48			·45–2·7	12		lum. arc 100–1,000 c.p.	51.00 7.30per100c.p.
Sunderland	400	m	38	3	80	2·7–5·4	a		·36–4·05	12		100w.	13.00
Sutton West	750	p		2	88			3.00				40w.	10.00
Tamworth	300	p		1½	64			3.84–4.80				60w.	12.00
Tara‡	620	m	38	4	50							100w.	
Tavistock	974	m	263	3	160	4·5	a		·135–3·51	12		100w.	16.00
Teeswater	832	p	22	4	100	12						60 & 100c.p.	10.00 & 15.00
Thamesford	381	m	38	2	95	2·25–4·5	a		·135–4·68	12		100w.	14.00
Thamesville	742	m	34	2	196	2·7–5·4	a		·135–4·23	12		100w.	15.00
Thedford	590	p	15	5	66	10						60w.	15.00
Thessalon	1,828	m	60	1½	188	10						arc & 60w.	
Thornbury	718	m	38	3	160	6						60w.	4.00
Thorndale		m	56	1	66	2·25–4·5	a		·135–4·68	12		100w.	14.00
Thorold	4,548	m	262	19	800	2·25	a					60w.	6.00
Tilbury	1,605	m	51	4	205	2.25–4·5	a		·135–3·87	12			
Tillsonburg	3,059	m	356	4	700	1·57–3·15	a		·135–3·42	12		80 c.p.	11.00
Timmins	3,229	p			8						50.00		
"		p	150	6	950	9						100w.	21.66
Toronto	473,829	m	48,750	432	52,700	·9–1·8	a		·12–1·2	12.00–15.00		100w.	8.00
"		p	24,000										
Toronto Township ‡	5,008	m		36	244	2·02–4·05	f		·135–3·78	12			
Tottenham	557	m	21	1¾	150	10						60w.	21.43
Trenton	5,169	m	3,750	32	1,060	1·35–2·7	a		·108–1·35	12		100 c.p.	10.00
Tweed	1,350	m	98	15	277	1·8–3·6	a		135–2·52	12		40 & 60 c.p.	10.00 & 12.00
Uxbridge	1,525	p	35		150	10						100w.	10.00
Vankleek Hill	1,577	p	49	3½	171	10½		4.20				100w.	10.00
Victoria Harbour	1,542	m	23	3	96	1·57–3·15	a		·135–3·51	12		100w.	9.00
Walkerton‡	2,388	p	188	10	400	1·8–8·1			·2–4·2	12	25–35	60 & 100w.	10.00 & 12.00
Walkerville‡	5,349	m	1,488	26	2,183	1·8–3·6	a		·135–3·24	12		60w.	5.60
Wallaceburg	4,107	m	225	18	593	2·25–4·5	a		·135–3.24	12		80 & 400w.	13.50 & 30.00
Warkworth		p	38	3	60	8		3.60				60w.	14.00

‡ System includes other places.

e, 10c. per 100 sq. ft. first floor area per month.

f, $18.00 per year service charge.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Ordinary lighting: Meter rate: Fixed charges	Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Power: Meter rate: Net per k.w.h.	Power: Meter rate: Fixed charge per h.p.-year	Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Ontario—*continued*						cents		dollars	cents	dollars	dollars		dollars
Waterdown	696	m	158	2½	131	1·8–3·6	a	..	·135–2·97	12	..	100w.	10.00
Waterford	1,027	m	113	5	141	2·25–4·5	a	..	·135–4·05	12	..	100w.	14.00
Waterloo	5,091	m	675	14	912	·9–1·8	a	.	·135–1·69	12		60 & 150w.	8.75 per 100w.
Watford	1,115	m	30	2	161	3·37–6·75	a	.	·135–6·39	12		60 & 100w.	18. per 100w.
Waubaushene	..	m	16	2	79	2·02–4·05	a	.	·135–3·24	12		100w.	12.00
Welland	8,825	m	1,875	35	700	·9–1·8	a	..	·099–1·17	12	..	100 & 200w.	9.00 & 18.00
" ‡	..	p	150	16	2,500	4	..	..	..	..	15.00	..	..
Wellesley	583	m	101	3½	..	2·25–4·5	a	..	·135–3·51	12	..	100w.	15.00
Wellington	829	p	..	2	90	..	..	4.32–7.20	..	..	..	60 & 100w.	9.40 per 60w.
West Lorne	708	m	..	5	101	7	..	..	..	..	..	100w.	16.50
Westport	786	p	60	3	125	..	..	4.56	..	..	..	100w.	10.95
Weston	2,283	m	525	8	600	1·12–2·25	a	..	·09–1·86	12		100w.	8.00–11.00
West Toronto‡	..	p	1,000	19½	978	1·35–2·7	..	..	1·35	12.00–16.20	..	..	..
Wheatley	605	p	20	2	100	..	..	4.80	..	..	..	100w.	12.00
Whitby	2,902	m	225	20	554	1·6–2·4	a	..	·48–1·6	12	20 –31 97	{60 c.p. {100w.	10 00
Wiarton	1,728	p	140	8	175	2–10	..	3.00	..	..	..	arc & 100w.	50.00 & 12 50
Williamsburg	..	m	23	2	51	2·25–4·5	a	..	·27–3·78	12	..	100w.	13 00
Winchester	1,042	m	50	6	200	1·8–3·6	a	..	·225–2·79	12		100w.	15 00
Windsor	28,064	m	1,500	45	4,000	1·8–3·6	a	..	·135–3·24	12		100 & 500w.	12 00 & 50.00
" ‡	..	p	600	50	2,250	1·8–7·2	..	..	·27–3·24	12		..	..
Wingham	2,474	m	150	14	450	8	r	4.00	2–3	n	40.00	100 & 250 c.p.	20.00 & 60.00
Winona‡	..	p	..	8	See	Hamilton	..	..	..	..	..	..	..
Woodbridge	615	m	60	4	98	1·8–3·6	a	..	·135–3·24	12	..	100w.	13.00
Woodstock	10,027	m	900	36	1,816	·9–1·8	a	.	·117–1·44	12	.	{250 c.p. {60–100w.	24.00 9 00
Woodville	357	m	36	2½	68	2·7–5·4	a	..	·36–4·05	12	..	100w.	13.00
Wroxeter	349	m	14	..	60	12	..	..	..	..	..	32 c.p.	..
Wyoming	526	m	23	8	90	2·25–4·5	a	.	·135–3·78	12	.	100w.	16.00
Zurich	500	m	38	1½	..	8	a	.	.	.	.	100w.	20.00

MANITOBA														
Assiniboia (Mun. of)	..	p	..	31	2,700	2 1/3–3	..			1·5–2·7	..	..	Lum. arc	73.00
Beauséjour	879	m	20	1½	50	13½	..			..	..	..	400 c.p.	46.00
Boissevain	948	m	56	3	130	15	..			..	..	..	250w. & 32 c.p.	15c per k.w.h.
Brandon	15,215	p	1,550	38	2,261	9½	n r			5–9½	n.r.	60.–65.	25,100&300w.	5c per k.w.h.
Carberry	931	m	35	4	155	15·3	..			..	..	..	enc. arc	80.00
Carman	1,426	m	60	4½	151	16	..			..	..	..	100 & 500w.	16c per k.w.h.
Dauphin	3,200	m	140	11¼	595	12	..			8 down	..	..	enc. arc	150.00
													80 c.p.	36.00
Fort Garry	..	p	..	..	112	5	n			3	n.	..	..	..
Killarney	989	p	50	3½	140	17	..			..	..	..	60 & 100w.	33.00 & 45.00
Melita	834	m	..	1½	100	15	n			..	..	..	100w.	8c per k.w.h.
Minnedosa	1,833	p	65	8½	290	12	..			5	..	..	100 & 250w.	15.00 & 30.00
Morden	1,261	m	35	6	200	16	..			..	..	..	100 & 150w.	20. per 100w.
Neepawa	1,854	m	135	4	300	15	..			4·9	..	..	250 c.p.	15c per k.w.h.
Portage la Prairie	5,879	m	525	15	760	12¾–14¼	..			2½–10	..	..	100–400 c.p.	30. average
Rapid City	658	m	..	3½	95	15	..			..	..	..	50 & 100w.	21.70 per 100w.
Reston	494	m	..	2	99	20	..			..	..	..	100 & 200w.	27.00 per 100w.
Rockwood	..	p	..	2¼	..	8	n			..	..	..	..	..
Russell	820	m	35	3	137	20	..			..	..	..	100w.	36.00
St. Andrews	..	p	..	11½	..	8	n			..	..	..	..	..
St. Boniface	11,021	p	See	Winnipeg.		..	..			..	..	..	arc	58.40–73.
St. Norbert	..	p	..	..	47	7½	..			5	n	..	..	..
St. Vital	..	p	..	..	437	3 1/3–5	n			3	n	..	arc	73.00
Selkirk	3,399	m	130	13	506	6	n			5	n	..	80c.p.&300w.	5c per k.w.h.
Shoal Lake	642	m	..	10	118	20	..			10	..	..	100 & 300w.	10c per k.w.h.
Souris	1,845	m	67	9	270	11¼–12	n r			..	..	..	60 & 100w.	..
Stonewall	1,152	p	60	4½	298‡	8	n			..	5	..	Inc.	5c per k.w.h.
Stony Mountain	..	p	60	1	..	8	n			..	..	..	Inc.	5c per k.w.h.
The Pas	1,270	m	110	5	284	9·35–9·9	n r	..		7·65–8·1	n r	..	250 & 400 c.p.	90. per 250 c.p.
Transcona	3,356	m	1,300	15½	641	4	n	..		0·6–4	..	..	1,000 c.p.	58.40
Winnipeg‡	163,000	m	21,000	212	35,000	2 2/3–3	..	..		0·4–3	..	..	Magnetite	68.00
													enc. arc	51.50
" ‡	..	p	23,000	500	12,502	2 1/3–3	..	..		1·5–2·7	..	..	1,000 c.p.	50.00
SASKATCHEWAN														
Arcola	852	p	..	8	132	16–18	..			..	..	..	100w.	23.60
Assiniboia	719	m	..	3	100	15	..			..	..	..	1,000 c.p.	
Battleford	1,436	m	..	10	270	10·4–12·8	..			8·8	..	..	enc. arc	
													100 c.p.	

‡ System includes other places.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Saskatchewan—*cont.*						cents		dollars	cents	dollars	dollars		dollars
Big River	697	p	..	1	120			3.00				enc. arc	..
Borden	158	p	10	1	33	20	..	5.00–10.00				25w.	20c per k.w.h.
Broadview	877	m	..	4	133	20						80 c.p.	20.00
Canora	835	m	63	3½	140	13½						60 & 100w.	10c per k.w.h.
Carlyle	412	m		3		18						250 c.p.	30.00
Davidson	513	m		6	125	20						100 c.p.	5.40
Earl Grey	256	m	9	2	52	25						100w.	..
Eastend	378	p	..	2	64	18						100w.	48.00
Estevan	2,140	m	150	14¾	500	10			6			60–200w.	3c per k.w.h.
Fort Qu'Appelle	295	p	12	6½	65	18						100w.	20.00
Govan	500	p	14	1½	60	25						100w.	25c per k.w.h.
Grenfell	873	m		4	145	16						100w.	24.00
Gull Lake	712	p	30	3¼	150	18	r					100w.	43.20
Herbert	912	p	40	4½	149	16						100w.	36.00
Humboldt	1,435	m	110	6	252	8¼–12¾			4·5–7·5			40w.–60 c.p.	11c per k.w.h.
Indian Head	1,334	m	130	8½	260	13–17						100 c.p. \enc. arc	70.00
Kamsack	1,202	m	94	5	200	12			8			60 & 100w.	8c per k.w.h.
Kindersley	770	m	55	1½	174	12½–16			16			100w.	3c per lamp-hr.
Lang	291	p	..	1	25	20						..	..
Langham	352	m	28	4	90	16						100 c.p.	22.50
Lashburn	235	p		1	50	20						60w.	15.00
Leader	490	p		5	300	15						240w.	..
Lloydminster‡	404	p		3½	150	13–15						32c.p.&60w. \enc. arc	14.40 & 18.00 75.00
Lumsden	615	p	14	3¼	91	20						..	..
Maple Creek	1,140	p	85	7	175	12–15						60 c.p.	30.00
Melfort	971	m		5	235	10						80c.p.& 100w	15.25
Melville	2,100	m		15	350	8–9·9					26.40	100 c.p.	10c per k.w.h.
Milestone	450	p		1½	61	..		11.40				100 & 60w.	31.20 & 16.80

Moosejaw	16,934	m	1,950	48	4,027	6·3			8·55–3·15			Mag. arc 100 & 60w.	2–2½c per k.w.h.
Morse	452	p	..	2½	87	18						100w.	36.00
North Battleford	3,145	m	400‡	30	725	7–9	n r	..	2–6	n.r.		enc. arc & 300 & 60w.	7c per k.w.h
North Portal	222	p	..	3/4	30	15–18	n	9.00–12.00				50w.	18.00
Outlook	613	m	50	10	168	16						enc. arc 110 c.p.	100.00 25.00
Oxbow	678	m	17	3	85	20	n	6.00				200 & 100w.	22.50 per 100w.
Ponteix	335	p	..	1	46	..		4.80–9.60				100w.	12.00
Prince Albert	6,436	m	570	33	1,208	6·8–7·6	n	..	2·7–4·5	12		enc. arc & 100–250c.p.	4c per k.w.h.
Qu'Appelle	722	p	..	2	100	18						60–100w.	23.30 per 100w.
Radisson	438	m	16	1½	50	20						100 & 200w.	18c per k.w.h
Regina	26,127	m	4,200	101	5,577	3·6–6·3	j	..	1·35–4·5	6.00		enc. & mag. arc	1.25c per k.w.h.
Rosetown	731	p	40	3	110	15–18	n r	6.00				60w.	12.70
Rosthern	1,200	m	25	6	105	15.3						100 & 300w.	
Rouleau	495	m	32	5	..	17						80 c.p.	15.00
Saltcoats	491	m	..	3	96	15						80w.	17.00
Saskatoon	21,048	m	3,600	57	4,760	5·4–7·2			1¼–5·4			enc. arc 60 & 100w.	70.00 3c per k.w.h
Scott	316	m	45	3	65	15	..	..	10			100 c.p.	10c per k.w.h.
Semans	288	p	12	½	54	20	n r	5.04–6.00				100 & 250 c.p.	21. per 100 c.p.
Shaunavon	897	p	12	¾	16	20		12.00				100w.	33.00
Strassburg	544	m	28	10	130	20		..				100 c.p.	23.00
Swift Current	3,181	m	350	30	900	5·4–9	n	..	1·8–4·5	n		40 & 60w.	2c–5c per k.w.h.
Tisdale	458	p	..	5	75	12			8				..
Wadena	449	m	28	3	101	20		..				80 c.p.	22.00
Watrous	843	p	30	4½	131	16·2–13·5		..				500w.	182.00
Watson	246	p	..	½	9	..		9.60	..				
Weyburn	3,050	m	290	8	640	9	..	..	2–5			enc. arc & 250 & 100 c.p.	8c per k.w.h
Wilcox	243	p	..	1	20	..		14.40				40w.	21.40
Wilkie	815	m	..	4	150	11·7–13·5						80 c.p.	11c per k.w.h

‡ System includes other places.
j, 50c. per h.p. per month.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken, k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 16-c.p. or 40-w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate, net per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
Saskatchewan—*cont.*						cents		dollars	cents	dollars	dollars		dollars
Wolseley	1,054	m	..	12	180	16–18	..	..	12	..	..	80 c.p.	16c per k.w.h.
Yellowgrass	408	m	..	5	95	15	..	..	..	..	..	60w.	50.00
Yorkton	3,144	m	350	17	600	9	..	..	2–5	..	..	100w.	8c per k.w.h.
ALBERTA													
Bankhead‡	..	p	..	12	472	11	..	..	..	..	..	enc. arc	75.00
Bassano	569	p	46	3	200	18	..	..	..	..	..	250w.	60.00
Bellevue	..	p	..	3¼	113	15	..	6.00–9.60	..	..	..	60 & 100w.	..
Blairmore	1,219	m	..	3	160	10	..	..	..	..	..	250w.	47.62
Bowness	..	p	..	6	12	9	n	..	2 up	..	..	100w.	..
Calgary	56,514	m	9,101	225	14,219	5	..	6.00	1–2	..		Mag. arc Inverted arc	60.00 50.00
"	..	p	1,400	16	2,500	4–5	n	..	1–2	..	..	Enc. arc	48.00
Camrose	1,692	m	100	6	350	9·9–11·4	n	..	5–10	n.	..	..	..
Canmore	..	p	390	1½	29	10	..	..	..	..	..	40 & 60w. & 80 c.p.	10c per k.w.h.
Cardston	1,370	m	75	5½	280	10–14	..	..	..	..	..	..	..
Carmangay	332	m	40	3½	200	18	n r	..	..	..	..	60w.	..
Claresholm	687	m	115	10	200	15	..	..	..	..	..	200w.	..
Cochrane	284	m	37	2½	50	..	..	9.60	..	..	12.00	200w.	18.00
Coleman	1,559	p	..	3	340	..	..	..	..	..	..	100w.	24.00
Coronation	456	m	26	4	140	10·8–18	..	..	..	..	..	enc. arc & 100w.	..
Didsbury	640	m	40	5	140	15–22	n	..	8	n.	..	60 c.p.	21.30
Drumheller	312	p	82	4	312	16·2	..	..	9	..		100w.	42.85
East Calgary	200	p	..	6½	25	10	..	6.00	2½	..		100 & 200w.	36.00 & 48.00
Edmonton	53,846	m	6,200	165	11,400	4·95–6·3	n	..	.99–2·7	n.		..	..
Fort Saskatchewan	993	m	31	3	160	14–16	..	..	..	..		40–350 c.p.	..
Frank	622	p	..	2	200	..	..	7.20		..		60 & 250w.	25.60 per 60w.
												100w.	24.00

Gleichen	591	m	22	2½	70	25	r	..				100w.	43.20
Hanna	711	p	40	5	150	18	..	9.60				100w.	18.00
Hardisty	357	p	35	1½	55	20	..	..				60 & 100w.	30.00 & 36.00
High River	1,182	m	55	10	275	11·6–14·4	..	10.80				16 & 32 c.p.	..
Hillcrest	..	p	..	7	125	..	..	6.00				60w.	37.00
Innisfail	838	m	15	5	172	13·5–16·2	..	..				60w.	..
Lacombe	1,047	m	60	4	250	12–18	..	..				80 c.p.	50.00
Lethbridge	9,436	m	1,210	44	2,400	6·3–9	..	..	1·8–5·4			enc. arc	75.00
Macleod	1,811	m	225	10	450	13½–11¼	..	..	..		..	enc. arc	3c per k.w.h.
Magrath	938	p	22	8	127	18	..	..	..		..	100 c.p.	22.50
Medicine Hat	9,272	m	1,100	..	1,500	5·4–7·2	..	..	0·4–6		..	100–300w.	24.00–48.00
Nanton	590	m	..	3	140	15	..	..	10		18.00	(Natural gas)	..
Nordegg	800	p	..	4	123	12	..	6.00	..		..	60–200w.	46. average
Okotoks	525	p	30	4	120	16·2	n	6.75–11.70	..		..	40w.	..
Olds	730	p	28	5	145	16·2	n	..	9	n.	..	100 & 200w.	27.00 per 100w.
Oyen	286	p	22	3	82	..	..	9.60–12.00	..	..	..	200w.	54.00
Pincher Creek	1,026	m	35	7	210	12–15	..	..	..	..	..	..	..
Pocahontas	..	p	..	4¾	..	..	..	6.00	..	..	..	50w.	12.00
Ponoka	604	m	..	3	140	16	r	..	..	..	..	..	..
Raymond	1,205	p	30	10	225	14	..	6.40–7.68	..	..	..	100w.	16c per k.w.h
Red Deer	2,203	p	120	12	380	11·2–19	..	..	4–16	..	..	60w.	9.60
Stettler	1,168	m	..	2	769	3	..	..	4	..	..	a.c. arc	125.00
Taber	1,412	p	65	14	275	11·4–13·3	r	..	..	..	..	enc. arc	..
Vegreville	1,156	m	150	4½	240	14	..	..	..	..	..	100 c.p.	14.25
Vermilion	929	p	..	5¼	175	15	..	..	..	..	..	80 c.p.	27.00
Vulcan	415	p	..	2	100	15–18	n r	14.40	..	..	..	100w.	43.00
Wainwright	818	p	30	5	135	13·5–15·3	..	..	..	..	..	100 c.p.	..
Wetaskiwin	2,048	m	..	7½	399	9·6–10·8	..	..	4–9	..	..	60–250 c.p.	30.00–90.00
BRITISH COLUMBIA												enc. arc	18.00
Alberni	500	m	..	5	83	11	..	..	..	..	..	250 c.p.	12.00
Anyox	2,320	p	..	10	250	..	..	..	..	..	..	100w.	3.50
Armstrong	950	m	50	10	250	10–15	n r	..	..	..	..	100w.	3.33
Ashcroft	..	p	13	2	81	20–25	..	..	2–5	n.r.	..	..	..
Britannia Beach	..	p	..	9	275	5	..	..	..	..	..	60w.	..
Chase	600	p	50	1	100	14	..	5.40	..	..	..	100w.	..
Clayburn	200	p	..	..	25	..	..	..	..	..	..	32 c.p.	..
Coal Creek	500	p	..	3½	102	..	..	6.00	..	..	..	enc. arc & 500w. & 16 c.p.	..

‡ System includes other places.

ELECTRIC PLANTS IN CANADA—*continued*

City or town	Population	Ownership	Power taken k.w.	Miles of streets	Number of consumers	Comparative rates: Ordinary lighting: Meter rate: Net per k.w.h.	Comparative rates: Ordinary lighting: Meter rate: Fixed charges	Comparative rates: Ordinary lighting: Flat rate, yearly, per 6-c.p. or 40-w.	Comparative rates: Power: Meter rate: Net per k.w.h.	Comparative rates: Power: Meter rate: Fixed charge per h.p.-year	Comparative rates: Power: Flat rate, net, per h.p.-year	Street lighting: Kind	Street lighting: Charges per year per lamp
British Columbia—*con*						cents		dollars	cents	dollars	dollars		dollars
Copper Mountain	200	p	..	4	..	..	..	..	..	..	..	..	..
Courtenay	500	p	42	5	110	6·3–12·6	..	..	5–7	..	..	100–350w.	7c per k.w.h.
Cranbrook	2,500	p	93	15	550	9·9–15·3	..	..	2½–10	..	..	25–250w.	6c per k.w.h.
Cumberland	1,200	p	..	6½	550	7–14	..	..	5–7	..	..	100–250 c.p.	7c per k.w
Duncan	800	m	50	7	165	12	..	..	4–6	..	..	100–250w.	..
Enderby	950	p	75	15	169	12–14	..	..	..	..	..	60w.	7.20
Fernie	3,146	m	150	7	600	13	..	..	12 down	..	..	{enc. arc, 100 c.p.}	8c per k.w.h.
Fraser Mills	900	p	..	1	118	..	..	..	..	..	..	100w.	..
Golden	900	p	..	4	120	..	..	6.72–9.60	..	..	..	25w.	15.00
Grand Forks	1,700	m	..	10	400	5–13	..	6.00	4–5	..	..	60–200 c.p.	2.40–7.20
Greenwood	778	p	85	8	150	9–13	n r	6.00	..	..	..	200 & 40w.	12.00 per 40w.
Hedley	500	p	50	2	90	15	..	7.20	..	..	..	..	..
Huntingdon	73	p	..	..	..	9	n	From Vancouver and Sumas, Wash., systems.				..	..
Kamloops	4,500	m	750	17	1,150	7–13	..	19.20	1¼–6	6.00	60.00	{arc, 100 c.p. & 60w.	..
Kaslo	722	m	135	4	225	15	..	4.80	1¼–4	6.00	..	60w.	17.15
Kelowna	2,500	m	195	14	525	12	n r	..	2–8	n.r.	..	80 & 400 c.p.	8c. per k.w.h.
Ladysmith	3,000	m	63	15	425	13	..	4.80–7.20	..	..	..	60–100 cp.	{28.00 per 100 c.p.
Merritt	703	m	125	8	300	15	..	..	7	..	..	250 cp.	55.55
Michel	1,100	p	..	1	81	13	..	..	..	..	..	16 c.p.	..
Mill Creek	..	p	..	1	50	..	..	..	..	..	..	100w.	..
Mission	797	p	22	1	60	9	n	3.96	..	..	..	60w.	21.00
Nanaimo	8,000	p	410	17	1,800	6·3–12·6	..	..	3–8	..	..	Mag. arc	50.00
Naramata	200	p	..	2	15	..	..	6.00	..	..	..	60w.	..
Nelson‡	4,476	m	1,500	25	1,400	7–9	..	..	2–4	..	..	60w.	3.20
New Denver	300	p	45	9½	90	20	n	7.20–9.60	..	..	..	..	..
New Westminster	15,000	m	800	56	8,297	3·2–7·2	See	Vancouver	..	..	..	32–1,000 c.p.	..

Ocean Falls	2,000	p		2	135	.		..				100–600w.	..
Peachland	385	m	30	7	60	..		1.20–6.00				60w.	10.00
Penticton	3,000	m	96	28	564	8–12						60w.–250 c.p.	25.00 per 100 c.p.
Phoenix	662	p	..	3	..	6–15		4.80	4–6			100w.	18.00
Port Alberni	940	m	50	10	250	11¼						100w.	20.00
Powell River	..	p	..	3¾	225	5			..			200 & 250w.	
Prince George	1,500	m	80	10	205	18–22	..		12			60 & 100w.	..
Prince Rupert	6,005	m	375	13½	1,000	6·4–9·45	n r	..	2·25–5·4	n.r.		80–400 c.p.	5c per k.w.h.
Princeton	400	p	.	5	100	15		9.60				250w.	30.00
Quatsino	.	p	..	1½	55	..						100w.	
Revelstoke	3,150	m	415	11½	796	6·4–10·4			0·5–12			{100w.–250w. / Mag. arc	. / ..
Rossland	3,500	p	4,400	12	800	3·6–9	n r	2·00–8	1·6–4	n.		{Mag. arc / 100 & 60w.	90.00 / 15.60 & 9.60
Salmon Arm	500	m	22	3¾	105	11·2–12·8	.		8			100 c.p. & 250 c.p.	.
Sandon	300	p	30	1	75	.		3.84–7.68					
Spence Bridge	105	p	4	2½	20	..	..	6.00				..	..
Summerland	2,500	m	28	7	150	12½	n					60w.	15.00
Swanson Bay	.	p	..	½	35	..	..					100w.	..
Trail	4,000	p	17,650	6	700	3·6–9	n r	2.00–800	1·6–4	n		{Mag. arc / 100 & 60w.	90.00 / 15.60–9.60
Uplands	60	p	..	3½	16	3·2–8·8	r	.	½–7	n		100w.	4.30
Vancouver ‡	102,550	p	43,250	662	40,600	3–8	n		·425–7	n		400 & 600 c.p.	35 00 & 38 00
" ‡	.	p	24,000	194	.	..			0·5–2	12			
Vernon	2,500	m	..	19	775	7·5–8	n		1·35–4·5	12		{arc and 400 & 600 c.p.	44.80
Victoria ‡	45,000	p	8,450	250	13,254	3·2–8·8	r	.	½–7	n			
" *	..	m	..	..	..	..	.	..	.	.		{Mag / enc. arc	45 00 / 50.00
Walhachin	100	p	..	..	12	..	..	..	..			40 c.p.	..
YUKON													
Dawson	3,013	p	..	6	550	8–25	n r	..	8–20	r		100w.	8–25c per k.w.h.
Whitehorse	450	p	..	3	110	25–40	r	..	..	..	..	60w.	50 00

‡ System includes other places.

* Municipal street lighting.

TABLE IV

Electric Plants in Canada—Grouped as to Size of Plant

Province	Hydro-electric										Steam								Internal combustion					
	0 to 100 h.p.		100 to 1,000 h.p.		1,000 to 10,000 h.p.		10,000 to 100,000 h.p.		100,000 h.p. and over		0 to 100 h.p.		100 to 1,000 h.p.		1,000 to 10,000 h.p.		10,000 to 100,000 h.p.		0 to 100 h.p.		100 to 1,000 h.p.		1,000 to 10,000 h.p.	
	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.	No. of plants	Total capacity, h.p.
Nova Scotia	3	140	9	3,334	..	..	..	..	..	..	4	265	14	4,285	5	18,928	..	..	3	225	..	..	..	..
Prince Edward Is.	5	207	..	..	..	..	..	..	..	..	..	..	2	475	..	..	..	..	..	..	..	..	..	..
New Brunswick	..	..	6	2,463	2	5,000	..	..	..	..	3	220	7	2,261	2	7,533	..	..	..	..	2	632	..	..
Quebec	19	1,252	47	15,009	16	52,250	8	267,800	2	249,600	3	155	10	3,620	6	13,016	1	22,000	5	109	3	1,130	..	..
Ontario	7	465	53	17,777	42	154,929	8	169,033	3	488,800	15	930	27	7,702	6	11,887	2	46,000	8	413	3	250	..	..
Manitoba	..	..	2	1,450	..	..	2	77,100	..	..	4	280	6	2,155	2	9,406	1	12,000	4	220	1	400	1	1,520
Saskatchewan	..	..	..	..	..	..	..	..	..	..	1	52	9	3,580	5	22,953	..	..	4	220	2	404	..	..
Alberta	..	..	2	880	..	..	2	31,100	..	..	7	445	28	8,959	5	11,739	2	30,662	35	1,498	12	2,510	..	..
British Columbia	4	227	9	2,400	10	36,402	8	219,000	..	..	2	155	12	4,975	7	24,004	1	17,333	3	292	3	1,040	..	..
Yukon	..	..	..	..	..	..	1	10,000	..	..	1	60	1	167	..	..	..	..	2	105	8	2,175	..	..
Canada	38	2,291	128	43,313	70	248,581	29	774,033	5	738,400	40	2,562	116	38,179	38	119,466	7	127,995	60	2,862	33	8,541	1	1,520

Total hydro-electric plants { Number 270
Horse-power 1,806,618

Total steam plants { Number 201
Horse-power . . . 288,202

Total internal combustion plants { Number 94
Horse-power . . . 12,923

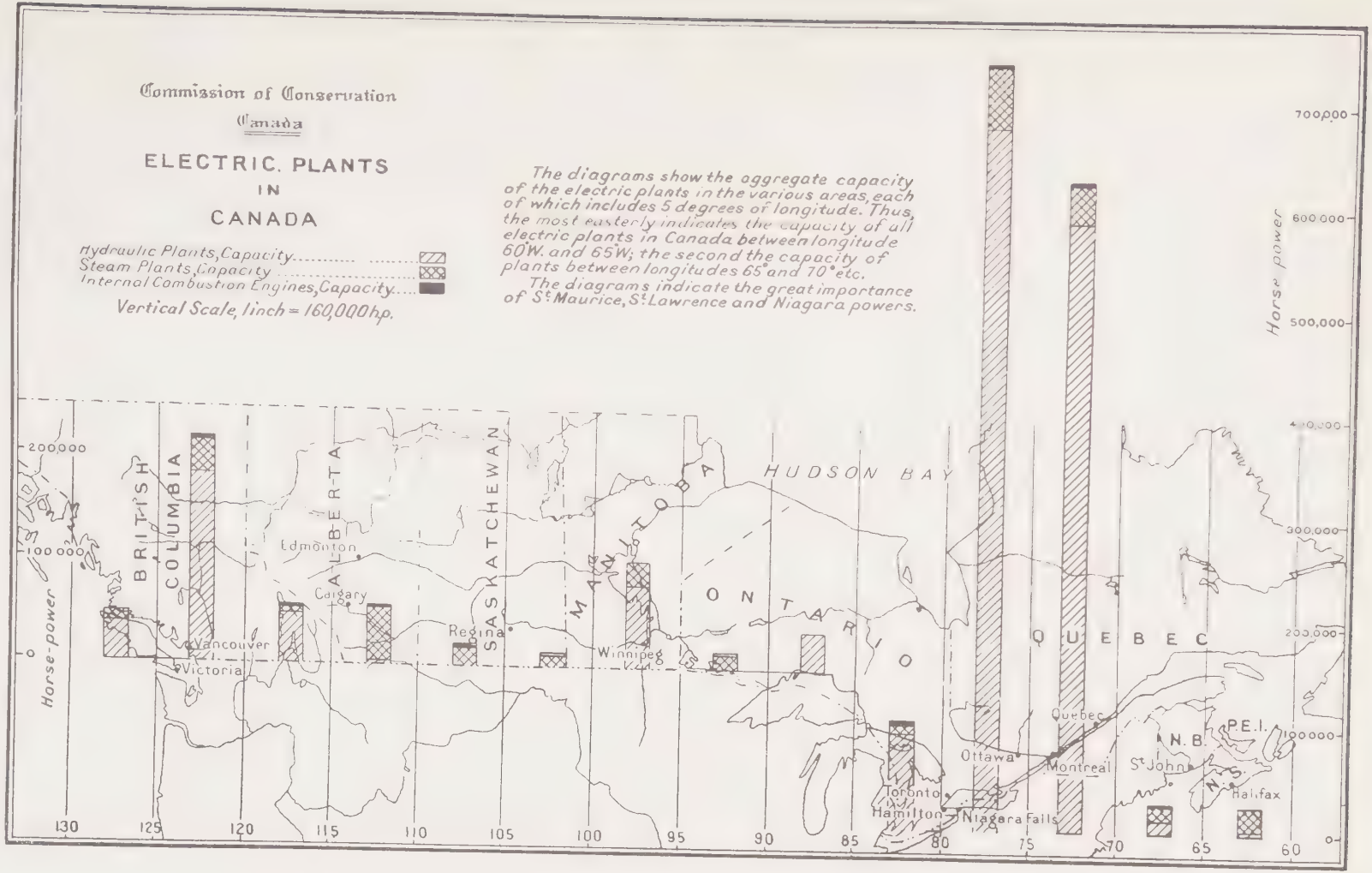

Commission of Conservation
Canada
ELECTRIC PLANTS
IN
CANADA
Hydraulic Plants, Capacity
Steam Plants, Capacity
Internal Combustion Engines, Capacity
Vertical Scale, 1 inch = 160,000 hp.
The diagrams show the aggregate capacity of the electric plants in the various areas, each of which includes 5 degrees of longitude. Thus, the most easterly indicates the capacity of all electric plants in Canada between longitude 60°W. and 65°W; the second the capacity of plants between longitudes 65° and 70° etc.
The diagrams indicate the great importance of St. Maurice, St. Lawrence and Niagara powers.
Horse-power
200,000
100,000
0
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
HUDSON BAY
ONTARIO
QUEBEC
N.B.
P.E.I.
N.S.
Edmonton
Calgary
Regina
Winnipeg
Vancouver
Victoria
Ottawa
Quebec
Montreal
St. John
Halifax
Toronto
Hamilton
Niagara Falls
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
0
Horse power
700,000
600,000
500,000
400,000
300,000
200,000
100,000

TABLE V

Electric Plants in Canada—Ownership, Prime Movers and Generators

Province	Ownership						Kind of prime mover						Kind of generator—Total capacity, k.v.a.			
	Private		Public		Totals		Hydraulic		Steam		Int. combustion					
	Number of plants	Total capacity, h.p.	Number of plants	Total capacity, h.p.	Total plants	Total capacity,	Number of plants	Total capacity, h.p.	Number of plants	Total capacity, h.p.	Number of plants	Total capacity, h.p.	3-phase	2-phase	1-phase	*Direct current
Nova Scotia	24	23,064	14	4,113	38	27,177	12	3,474	23	23,478	3	225	15,736	3,674	218	2,480
Prince Edward Is.	9	1,314	..	..	9	1,314	5	207	2	475	2	632	817	30	396	.
New Brunswick	16	16,212	7	2,395	23	18,607	8	7,463	12	10,014	3	1,130	10,632	1,788	72	1,341
Quebec	99	604,903	20	20,158	119	625,061	92	585,911	20	38,791	7	359	428,973	75,236	1,408	1,798
Ontario	105	609,658	68	290,198	173	899,856	113	831,004	50	66,519	10	2,333	708,639	23,864	1,266	5,683
Manitoba	8	53,706	15	49,309	23	103,015	4	78,550	13	23,841	6	624	79,630	648	90	1,910
Saskatchewan	26	2,682	36	27,911	62	30,593	..	..	15	26,585	47	4,008	18,225	7,140	102	444
Alberta	27	43,235	25	41,882	52	85,117	4	31,980	42	51,805	6	1,332	57,829	3,538	..	3,888
British Columbia	41	290,234	22	16,542	63	306,776	31	258,029	22	46,467	10	2,280	218,664	750	204	1,337
Yukon	3	10,227	..	..	3	10,227	1	10,000	2	227	..	..	6,150	..	..	15
Canada	358	1,655,235	207	452,508	565	2,107,743	270	1,806,618	201	288,202	94	12,923	1,545,295	116,668	3,756	18,896

* Only includes an incidental portion for railway service.

TABLE VI

Electric Plants in Canada—Load, Service, Etc.

Province	Maximum load, total kilo-watts						Service; number of plants giving:			Number of hydraulic plants reporting:			Steam plants, total h.p.		Internal combustion engines			
	Prime mover			Uses											Total h.p.		Number of plants	
	Hydraulic	Steam	Internal combustion	Light	Power	Miscel.	Continuous	Night	Auxiliary	Use of storage	Ice trouble	Low flow	Turbines	Engines	Gas	Oil	Gas	Oil
Nova Scotia	1,259	12,357	45	5,727	5,333	2,601	13	21	4	3	1	..	11,216	12,262	175	50	3	..
Prince Edward Is.	120	..	575	575	120	..	1	6	2	..	..	..	..	475	632	..	2	..
New Brunswick	2,517	4,785	370	3,983	1,529	2,160	13	9	1	..	..	2	3,853	6,161	650	480	2	1
Quebec	333,610	3,790	83	116,148	201,385	19,950	63	38	18	16	13	16	29,966	8,825	325	34	5	2
Ontario	480,954	3,117	314	148,746	300,349	35,290	93	53	27	33	9	12	54,934	11,58.	2,317	16	8	2
Manitoba	44,065	2,646	247	15,847	19,724	11,387	11	9	3	.	1	1	12,000	11,841	289	335	3	3
Saskatchewan	..	12,940	1,600	6,386	6,379	1,775	18	43	1	..	..	..	18,933	7,652	2,199	1,809	19	28
Alberta	8,160	20,546	499	11,328	12,688	5,189	25	23	4	2	..	2	31,634	20,171	1,320	12	6	..
British Columbia	129,270	9,728	686	29,398	81,589	28,697	36	17	10	5	3	5	38,787	7,680	250	2,030	1	9
Yukon	4,000	15	..	115	3,900	..	1	1	1	..	1	1	167	60		..	..	..
Canada	1,003,955	69,924	4,419	338,253	632,996	107,049	274	220	71	59	28	39	201,490	86,712	8,157	4,766	49	45

Total demand=1,078,298 k.w., or 1,445,440 electric horse-power.

TABLE VII

Electric Plants in Canada—Transmission Lines and Distribution

Province	Transmission lines;				Distribution systems											
	Total mileage of lines at:			Total miles	Ownership				Totals		Total mileage streets	Line transformers		Total number of consumers	Connected load	
					Public		Private									
	10 to 30 kilo-volts	30 to 99 kilo-volts	100 k.v. and over		Number of systems	Number of municipalities	Number of systems	Number of municipalities	Total systems	Total municipalities		Total number	Total capacity, k.w.		Lighting and miscellaneous, k.w.	Power, h.p.
Nova Scotia	84	..	..	84	14	14	21	36	35	50	484	1,584	12,188	20,495	11,703	7,618
Prince Edward Is.	..	..	..	..	..	..	7	8	7	8	58	281	1,214	2,319	1,425	152
New Brunswick	32	..	..	32	9	13	16	20	25	33	350	1,524	11,862	14,475	9,399	3,584
Quebec	447	757	142*	1,346	31	35	126	231	157	266	2,206	16,630	163,037	194,836	105,382	337,110
Ontario	1,618	850	435	2,903	235	266	97	129	332	395	4,998	21,100	244,345	297,757	212,825	351,578
Manitoba	11	138	..	149	18	19	5	13	23	32	924	3,997	38,489	58,378	54,822	67,534
Saskatchewan	..	..	..	..	36	36	26	26	62	62	556	2,114	20,273	25,191	13,860	13,461
Alberta	18	100	..	118	24	24	25	27	49	51	713	3,612	25,934	40,834	20,966	27,528
British Columbia	218	601	..	819	22	22	38	52	60	74	1,554	10,236	89,466	75,752	67,214	161,735
Yukon	..	39	..	39	..	..	2	2	2	2	9	44	200	660	250	185
Canada	2,428	2,485	577	5,490	389	429	363	544	752	973	11,852	61,122	607,008	730,697	497,846	970,505

* Includes portion of Cedars-Massena line in Ontario.

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